FINAL REPORT

ASSESSMENT OF STATUS OF RIVERINE WETLANDS IN THE SANTA ANA AND SAN JACINTO RIVER WATERSHEDS

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1 PROJECT BACKGROUND AND PROBLEM STATEMENT

California is one of the four most ecologically degraded states in the United States and contains some of the country's most endangered ecosystems. More than 90% of California's wetlands and riparian areas have been lost. A full 25 percent of plants and 55 percent of animals listed as threatened or endangered by the State of California depend on wetland habitats.

One of the main documents that define wetland protection and regulation within a region is the Regional Board's Water Quality Control Plan for the Santa Ana River Basin, or *Basin Plan* (SARWQCB, 1995). The Basin Plan recognizes the importance of wetlands as part of the aquatic environment, but falls short of providing a comprehensive, up-to-date regulatory strategy for wetlands management. The Basin Plan also recognizes that additional protection for, and more comprehensive listing of, wetlands resources will occur as part of the ongoing Basin Planning process. Updating the Basin Plan's consideration of wetlands, and developing criteria for wetlands protection, was identified as the No. 6 priority (out of 29 priority issues) in the Regional Board's 2002 Basin Plan triennial review and work plan for addressing priority basin planning issues. The 2006 Basin Plan triennial review includes this issue as the No. 9 priority, out of 36 priority basin planning issues.

This project provides support for future promulgation of Basin Plan Amendments *by assessing the status of riverine wetlands*. The purpose of this project was to assess the extent and condition of Region 8's riverine wetland resources by providing (1) a landscape assessment of wetland status within the basin that describes the extent and geographic position and (2) a probability-based survey of wetland condition using the California Rapid Assessment Method (CRAM) on a selected set of riverine wetlands. The project was completed in accordance with the projects' Quality Assurance Project Plan (QAPP, 2006).

2 STUDY AREA

The study area for this project is Region 8 of the California Regional Water Quality Control Board (*Figure 1*). Region 8 includes the entire watershed of Santa Ana River, coastal watersheds of parts of Orange County, and a small part of the San Gabriel River watershed. Together, the geographic scope of these watersheds encompasses 2800 sq miles of land. In general this region is characterized by a mild semi-arid climate with an average rainfall of 15 inches per year. The region is highly urbanized, with land uses ranging from residential, commercial and industrial, recreational, agriculture, and open space. Region 8 spans three counties: Orange, Riverside and San Bernardino. Approximately *19.2%* of the watershed falls in Orange County, *44.5%* in Riverside and *36.3%* in San Bernardino County.

The watershed contains three major hydrologic units: The San Gabriel, Santa Ana and San Jacinto (*Figure 2a*). The majority of the watershed falls within the Santa Ana (69.5%) and San Jacinto hydrologic (27.4%) units; thus these areas are the focus for this study1. The study area can also be disaggregated into three elevation ranges: 0-350 meters (30.5%), 350-700 meters (35.4%) and greater than 700 meters (34.1%) (*Figure 2b*).

The combination of elevation ranges and hydrologic units characterize variability within the watershed. The Region 8 watershed was therefore stratified based on hydrologic unit and elevation. This stratification resulted in five strata as follows:

- Santa Ana 0-350 m (SA 0-250) 30.5% of the watershed area,
- Santa Ana 350-700m (SA 350-700) 18.8% of the watershed area,
- Santa Ana 700+ m (SA 700+) 23.3% of the watershed area,
- San Jacinto 350-700m (SJ 350-700), 16.6% of the watershed area; and
- San Jacinto 700+ m (SJ 4700+) 10.8% of the watershed area.

There are no elevations in the San Jacinto hydrologic unit that fall below 350 meters, hence this strata was eliminated (*Figure 3*).

3 PROJECT DESCRIPTION

The purpose of this project was to assess the extent and condition of *riverine* wetlands in the Santa Ana and San Jacinto River watersheds. The selection of riverine wetlands as the scope of this project was determined in consultation with Region 8 personnel, the Southern California Coastal Water Research Project (SCCWRP), and personnel from the United States Environmental Protection Agency (USEPA). The rationale for addressing riverine wetlands is as follows: (a) CRAM has been calibrated for riverine wetlands; (b) CRAM analysis of estuaries/tidal wetlands will be conducted by SCCWRP at a later date; and (c) a sample frame for riverine wetlands already exists.

The measurement of wetland extent and condition was conducted using a Level 1 and Level 2 tiered assessment of wetlands in a manner consistent with the US EPA Region 9's tiered assessment of wetlands (USEPA 2006). This method defines three tiers of assessment. A Level 1 assessment is based on a "landscape assessment" that includes resource inventories and landscape profiles. A Level 2 assessment is defined as a "rapid assessment" which focuses on ambient condition and initial diagnosis of project status relative to ambient condition. A Level 3 assessment is an intensive site assessment that uses quantitative methods such as Index of Biotic Integrity (IBIs) or Hydrogeomorphic (HGM) indicators to assess site condition and calibrate the Level 2 assessment. A level 3 assessment is beyond the scope of this project. In this project, we conducted ***Level 1 (landscape assessment) and Level 2 (rapid assessment)*** assessments of riverine wetlands within the Santa Ana and San Jacinto River hydrologic units of Region 8.

This project represents a collaboration coordinated between Region 8, the Southern California Coastal Water Research Project (SCCWRP) and faculty and students from California State University Long Beach.

4 LEVEL 1 LANDSCAPE ASSESSMENT OF WETLANDS

Measurement of wetland extent and condition was conducted in a manner that is consistent with the US EPA Region 9's tiered assessment of wetlands (USEPA, 2006) within the constraints of available National Wetland Inventory (NWI) wetland maps and additional data sources to be consulted as part of the landscape assessment. The landscape assessment was conducted in accordance with limitations identified in the QAPP.

4.1 Methodology

The landscape assessment used existing US Fish and Wildlife Service National Wetland Inventory (NWI) wetlands data in the study area to develop *landscape profiles* that describe the extent and geographic distribution of riverine wetlands within the region.

The study area contains *70* USGS 1:24,000 7.5 minute (1:24,000 scale) quadrangles. Digital maps of NWI wetland data currently exist for *28* of these quadrangles, or *40%* of the area (*Table 1; Figure 4*). Wetland data for these available quadrangles were obtained from the US Fish and Wildlife Service's Wetland Mapper download site (USFWS, 2006). The lack of NWI coverage for *60%* of the Region 8 study area constitutes a substantial data gap for the Level 1 landscape assessment.

Available digital NWI wetland data for the 28 quadrangles was downloaded and merged in a GIS. Landscape profiles were developed to describe and summarize the distribution of wetlands across Region 8. Tables 2 and 3 and Figures 5 and 6 identify the types and extent of wetland coverage in the region. Riverine wetlands constitute *11%* of the wetlands in the data available for the study area. *Appendix A contains detailed maps of the Region's wetland resources*.

4.2 Landscape Profiles

Landscape profiles describe the pattern of the diversity of wetlands in the region and can be used to characterize the wetland resources. Landscape profiles and the wetland inventory data sets can establish a baseline from which future assessments of net change in acreage can be assessed. The applicability of these profiles is limited by the availability of NWI data upon which they are based. For the purposes of this analysis landscape profiles were constructed from the available NWI wetlands data.

Riverine wetlands were selected from the dataset and evaluated using various geomorphic parameters (*Figure 7 and Tables 4 and 5*). The majority of riverine wetlands represented in the dataset (57%) fall in the San Jacinto 350-700 strata (*Figure 6*). Landuse data from the Southern California Association of Governments (SCAG) was obtained to evaluate the types of classified land uses upon which riverine wetlands occur (*Table 5*). As expected the majority of riverine wetlands occur on vacant parcels.

5 LEVEL 2 ASSESSMENT OF WETLAND CONDITION

NWI datasets are currently not up to date, represent only 40% of the region, and therefore cannot reflect the current status of wetlands within the region. A Level 2 probability-based survey of the condition of wetlands was therefore required. This survey applied the field-based California Rapid Assessment Method (CRAM) (Collins et al., 2006) to a selected set of riverine wetlands. The objective of the data collection was to provide comparable rapid assessments of wetland condition at thirty five (35) different locations across the Santa Ana River Basin of Southern California.

5.1 Data Frame

A probabilistic sample of 750 stream sites was previously generated for the SARWQCB Region 8 by US EPA Environmental Monitoring and Assessment Program (EMAP; Anthony Olsen, USEPA, Western Ecology Division, Corvallis, OR) for ambient water quality assessment in the Region's streams and rivers. The target population for this sample set consists of all streams within the Santa Ana Regional Water Board regional area, as represented by the National Hydrography Dataset (HND), and thus is consistent with the targeted sample population in this study. A Generalized Random Tessellation Stratified (GRTS) survey design for a linear stream resource was used. The GRTS design includes reverse hierarchical ordering of the selected sites (Olsen, 2004). The GRTS survey design was deemed the most appropriate for probability-based assessments of linear systems such as streams and rivers by EPA/EMAP statistical staff. The data frame provides statistically sampled stream site locations that are correlated with and can serve as surrogate information for riverine wetland locations, the focus of this study. The 750 sites contained in this sample frame are depicted in *Figure 8*.

5.2 Sampling Design

Thirty five (35) riverine wetland sites were selected for CRAM assessment. Seven (7) sites were visited within each of the five (5) strata. According to the QAPP, thirty (30) sites were originally designated for CRAM field assessment; thus an additional 5 sites above the original project scope were included in this analysis. The rationale for evaluating a minimum of 30 sites was based on a statistical power analysis of the sample size required to determine if the sample population exceeds a certain threshold (i.e. CRAM score of 70) with a 10% confidence level. The 35 sites selected for CRAM assessment were selected from the 750 sites contained in the data frame. Limited funding available to conduct CRAM investigations served to restrict sample size.

The base EMAP sample frame for the Region 8 study area contains 750 sequentially ordered sites in the five strata (*please refer to Figure 3*). These strata are based on hydrologic unit and elevation (*please refer to section 2: Study Area*). Sampling occurred within each of these strata to ensure that CRAM analyses were conducted in areas representative of the region. A total of seven (7) sites per strata were sampled.

The probabilistic sampling design assigned each site with a numerical site ID. The statistical integrity of the sample required that sites be sampled in numerical order, from lowest to highest, based on this designated site ID. The seven (7) sites per strata were selected sequentially, with all efforts made to sample the low numbered sites. If it was necessary to replace a site (due to non viability of a site), sampling at the next sequential site was attempted until seven (7) sites were sampled within each stratum. Please see Appendix B for details on the data fame.

5.3 Ground Truth of Sample Sites

Prior to the field CRAM analyses a detailed site reconnaissance of the EMAP-generated sites was required to determine site viability for CRAM analyses. Site viability was assessed by an in depth field reconnaissance effort undertaken by the CSULB Geography Department's Geography 481 (GIS for Natural Sciences) course. Students used handheld Garmin Global Positioning Systems (GPS) units to locate each field site based on their designated latitude and longitude. Site viability was assessed by determining if access to the site is allowed and if site could be safely assessed. The reconnaissance effort attempted to visit sites in numerical order based on their site ID in accordance with the EMAP probabilistic sampling design. Details on the sample frame and comments from the ground truth reconnaissance can be found in Appendix B. The field inventory included CRAM analyses of 30 sites selected from the 750 sample frame (*Table 6*).

6 CRAM FIELD ASSESSMENT

General condition of the wetland habitat was assessed using the California Rapid Assessment Method (Collins et al., 2006, CRAM, Version 4.1). This section provides results of the CRAM assessments and an evaluation of riverine wetland condition based on the CRAM assessments, fieldwork, and their analysis.

6.1 CRAM Procedure – Data Validation and Verification

The implementation of CRAM sampling activities followed the CRAM SOP Version 4.1 (Collins et al. 2006) and the implementation plan outlined in the QAPP (Wijte, Wechsler and Adelson, 2006). Site reconnaissance occurred prior to the field CRAM assessment to ensure that the site visited was viable for CRAM assessment. Once sites were selected based on the results of student field reconnaissance efforts, a CRAM office assessment was performed. This consisted of collecting background documentation on the site (such as DOQQs, existing digital geospatial data using Google Earth technology, and other resources such as Thomas Guides and USGS quadrangles). Please see *Appendix C* for examples of this material. This information was used to develop an initial assessment of the CRAM assessment area, metrics and stressors. Using this information, the characteristics listed in Table 7 were examined for each site prior to the site visits.

In most instances two-person field crews conducted the field sampling. Teams included a designated field crew "captain" and a field technician. Field crews then drove to each site using the sites' designated GPS coordinates. Once a site was located, field crews verified the assessment area and conducted the CRAM assessment. Field crews completed hard copy field data sheets for CRAM assessment (*please see Appendix D for a sample data sheet*). All field data sheets were labeled with the unique site ID code and dated. Prior to departing the site the in-field site supervisor of the fieldwork verified that all datasheets were accounted for and complete. Site CRAM data sheets were then entered into an excel spreadsheet developed for use in this project[1] and provided in *Appendix E*.

[1] The data entry methodology differed from that outlined in the QAPP. The QAPP indicated that an access database would be made available by SCCWRP for entry of field CRAM data sheets. This database was not available at the time field surveys were undertaken.

6.2 CRAM Metrics

In the field, all the study sites were analyzed using the CRAM metrics identified in Table 8. Additionally, the presence and impact of the CRAM data stressors (provided in Tables 9-12) were estimated at every study site.

7 SUMMARY ANALYSIS AND INTERPRETATION OF CRAM ASSESSMENT DATA

This section contains the results of the CRAM field assessments conducted from August through November 2006. CRAM analyses were performed at 35 sites distributed between the 5 designated strata (*Figure 3*).

7.1 Analysis Methodology

CRAM field scores for all 35 sites were compiled to calculate overall metrics and CRAM scores for the sites. The data was analyzed by the statistical software Minitab (Minitab Inc., 2003).

7.2 CRAM Results

The mean and standard deviation (SD) of all attribute scores and the wetlands' overall CRAM scores for all sites in the separate strata were calculated. There were no significant differences in the overall wetland condition or CRAM score among the different strata sampled (*Figure 9*, One-way ANOVA, p=0.065).

All CRAM score values collected followed the normal distribution (*Figures 10*, Anderson-Darling test, p=0.111). This means that there was no imbalance between the prevalence of higher versus lower CRAM scores. The CRAM scores of the thirty five (35) wetlands we analyzed were normally distributed around a mean of 63.22% (SD = 9.29 %), from a low value of 42.3% up to a high of 82.7%. Therefore, our data did not show mostly extreme CRAM scores, with many high or low scores. This leads us to "suspect" that the complete collection of wetland sites (of the 750 sites in the data frame) that we could have sampled from, while we followed our Quality Assurance Program Plan (QAPP), have CRAM score values that will vary around the low 60%. Our median CRAM score of 65.4% indicates that 50% of the wetlands in our collection available for sampling (Olson, 2004) are likely to show a CRAM score that is higher than this 65.4%.

Based on this analysis of the CRAM results the following conclusions can be made:

A. When determining the success of mitigation projects, researchers that apply CRAM as a method to evaluate wetland mitigation projects (Ambrose and Lee, 2004, Quigly et al. 2006) considered sites with CRAM scores above 79.2% as complete successes, sites with CRAM scores between 54.2 and 79.2% as partial successes, and wetlands that scored below 54.2% as considered failed mitigation projects. These mitigation evaluation reports listed CRAM scores below 54.2% for 23 of 79 sites (Ambrose and Lee 2004), 27 of 44 sites (Quigly et al. 2006), and , and above 79.2% in 3 of Ambrose and Lee's sites, in none (0) of Quigly et al's sites. Ambrose et al. (2006) in a report to California Environmental Protection Agency (Cal-EPA) describe the outcomes of CRAM study of wetland CRAM study of 129 mitigation sites distributed across the twelve regions and sub-regions of the State Water Resources Control Board (SWRCB). This study also included CRAM analysis of 47 wetland reference sites across California. The overall CRAM scores for the reference sites had a mean±SE of 79%±1.4, with a median of 82% (Ambrose et al. 2006). The distribution of CRAM scores of the reference wetlands caused Ambrose et al. (2006) to lower their cut-off limits both separating completely from only partially successful mitigation projects and distinguishing between partially successful projects and projects that are failing or had failed to 70 and 50%, respectively. Among the 129 mitigation sites examined, only 19% were optimal. About half were partially successful, and a quarter or 33 of the mitigation sites showed a marginal to poor outcome (Ambrose et al. 2006). The foundation of these new, lower, 50 and 70% limits on Ambrose et al.'s (2006) database of CRAM

scores for California non-mitigation related, reference wetlands may increase the chance of these lower values to be accepted as CA standards in the near future. In order to ease comparison with CRAM datasets from other regions, in this current report we provide our Santa Ana/San Jacinto CRAM results relative to both sets of previously reported mitigation success markers; the earlier 54.2 and 79.2% markers (Ambrose and Lee, 2004, Quigly et al. 2006) and these newer 50 and 70% markers (Ambrose et al. 2006). In our collection of our randomly selected sites (Olsen 2004), twenty percent (6 sites) of 35 sites had a CRAM score over 70% and only ten percent (3 sites) scored below 50% (*Figures 11 and 12*), while only 2.5% (1 site) scored above 79.2%, but twenty percent (7 sites) of the 35 sites had CRAM scores below 54.2% (*Figures 13 and 14*).

B. If our Santa Ana/San Jacinto sites' condition would have been the result of mitigation efforts the remaining 26 (based on the Ambrose et al. 2006 markers) or 27 (based on earlier markers) sites would have been considered partial mitigation successes.

C. The literature currently provides the three examples of reports on riverine environmental resource related projects that have used CRAM analysis to evaluate wetland condition following mitigation (Ambrose and Lee 2004, Quigly et al. 2006, Ambrose et al. 2006). These are the only three project reports currently available. This project is therefore among the first to have used the CRAM method to evaluate riverine wetlands. We did not focus on so away from post-mitigation wetland sites, and our study, though smaller in sample size, will be comparable to that of Ambrose et al. (2006).

D. There was no relationship between the site elevation and its CRAM score in this Santa Ana/San Jacinto study (*Figures 15*, Correlation test, r =0.0179; p=0.22). Thus, it was obvious that wetland site elevation cannot be useful in identifying wetland sites that may be in need of restoration, and that full CRAM analysis should be used for this purpose.

8 DISCUSSION

The subsections in this portion of the report are derived from Task 4 of the project deliverables. This specific task requested a "Discussion Paper" which includes the elements contained herein.

8.1 Inventory Assessment – Data Gaps

The Level 1 landscape assessment of wetland resources within the region was conducted using available NWI data. This descriptive assessment was performed on only 40% of the region which is currently covered by the NWI. USGS quadrangle maps of the region that have not yet been included in the NWI coverage, shown in Table 1 and Figure 4, were reviewed by Regional Board staff familiar with the region's geography. This review shows that major portions of valley and mountain reaches of the Santa Ana River and its principle tributaries are under-represented in the NWI coverage. Portions of these stream reaches are known to support significant riverine wetland resources, including some that are, or closely approximate, pristine conditions. Because the NWI under-represents the regions' riverine wetlands, the Level 1 Landscape Assessment similarly under-represents these wetlands. Consequently, while the landscape assessment can be relied upon to report on the condition of wetlands within the available quadrangles, the assessment does not adequately represent riverine wetlands throughout the region. As NWI data becomes available for the data gaps identified in Table 1 and Figure 4, a subsequent NWI-based Level 1 landscape assessment will improve our understanding of the Regions' wetland resources. The landscape assessment provided in Section 4 and Appendix A provides a descriptive summary of the current status of wetlands in the Region based on existing NWI data.

Sample site locations for the Level 2 CRAM Assessment of riverine wetland condition was based on a probabilistic sample design, per USEPA and utilized per the approved QAPP. The data frame from which the sample site locations were derived was based on a USEPA EMAP data frame that was statistically derived from data as represented in the National Hydrography Dataset (NHD) river reach files. Sample points in the data frame were expected to correspond geographically to stream water bodies within the region and therefore serve as a surrogate for riverine wetlands. Therefore CRAM site locations selected

for analysis in this project should correspond to riverine wetlands within the region. The QAPP provided for an assessment of thirty (30) sites, six (6) within each of the five strata. Ultimately CRAM analyses were performed on thirty five (35) sites within the region, seven (7) within each stratum. The sample size of 30 sites intrinsically recognizes that there are gaps in the data, but that the gaps in the data should be statistically insignificant. Therefore CRAM results for these thirty five (35) sites provide a statistical representation of the status of riverine wetlands within the region.

The sample frame for the Level 2 rapid assessment was not based on NWI data and did not take into account the locations of existing riverine wetlands within the region. The statistical power of subsequent CRAM studies in the region could perhaps be improved by revising the EPA's EMAP probabilistic sample design to include NWI information in the sample data frame.

8.2 Implementation

The sites evaluated under this contract serve as a baseline assessment of the riverine wetlands in Region 8. Santa Ana Regional Water Quality Control Board (Region 8) personnel will crosscheck the landscape assessment and CRAM assessment work completed under this contract with the Region's wetland inventory work that is expected in the near future. As part of each triennial Basin Plan review, Region 8 personnel will continue to perform CRAM assessments. These will include assessments of some of the sites included under this contract as well as others in the region that have not yet been evaluated. These periodic assessments will provide a continuing evaluation of the Regions' riverine wetland resources.

8.3 Technical viability of CRAM

This section of the report discusses the technical viability of the use of the California Rapid Assessment Method (CRAM) with respect to the Region's Basin Plan Amendment efforts.

CRAM was applied as a tool to gain an understanding of the quality and quantity of riverine wetland resources in the region. CRAM provides a quick, low-cost, peer-reviewed, reliable, simple, repeatable, and easily taught method of assessing wetland quality. The outcome we were expecting was an improved understanding of how much of the resource exists and the condition of that resource. Because CRAM is an easily used assessment tool, it has high potential value for ongoing monitoring of the condition of wetlands. Regular monitoring of selected sites for compliance with water quality standards establishes benchmarks for trend analyses and provides an important check on the effectiveness of Basin Plan implementation. This assessment demonstrates that CRAM can be used as a regular monitoring tool in a program to determine the effectiveness of Basin Plan amendments that implement policies intended to protect wetlands resources.

This assessment has shown that CRAM is well suited for characterizing both the condition of a wetland and the factors that affect the condition of the wetland in its immediate drainage-shed, and for comparing wetlands within a hydrologic region, such as Region 8. The CRAM approach provides data that appears sufficiently robust to support complex spatial analysis of wetland resources, while also being useful for simple comparisons between wetlands.

8.3.1 Usefulness of CRAM assessments

This project provides baseline CRAM assessments of the sites sampled per USEPA guidance. CRAM is a reliable, quick, and simple assessment tool. It therefore can and should be used for future monitoring of riverine sample sites for trend monitoring purposes. The application of CRAM in this assessment shows that CRAM can be a useful tool as part of a regional monitoring program to determine the overall condition and ecological stability of a hydrologic area's riverine wetlands resources. However, since the concept of wetland size does not apply to riverine wetlands, due to their linear and bifurcated forms (see CRAM Version 4.0, Section 3.3), data collected through the use of CRAM may not be directly useful to assess gain or loss of riverine wetlands resource acreage.

8.3.2 Use of CRAM data in guiding decisions regarding BPAs

CRAM can provide information to Regional Board staff and others needed as part of decision making processes to determine where and whether to place restrictions, prohibitions, mitigation guidelines, restoration goals, or other regulatory controls needed in water quality control plans to protect wetland resources. This same information may provide insights that lead to creation of alternate quasi-regulatory, cooperative and/or voluntary approaches for protection of wetland resources, such as establishment of conservancies, mitigation banks, restricted land uses, general plan amendments, etc. Should this occur, Basin Plans may be amended to recognize that stakeholders have identified a variety of management practices that can be used to compliment the Board's regulatory authority to protect wetland resources.

This assessment has also shown that CRAM has proven to be a valuable tool for conducting numerous assessments of wetland resources in an area for the purpose of creating large scale wetland resource management plans, should there be the impetus to do so. The USACE's San Diego Creek, Orange County, Special Area Management Plan is an example of a plan that relies on data that assesses quality of wetlands in a hydrologic area to lead to management decisions. This plan identifies high-value aquatic resources within the San Diego Creek watershed that are designated for enhancement, restoration and long-term protection as the watershed develops. These aquatic resources include riverine wetlands. The SAMP also recognizes that certain aquatic resources without high potential for enhancement, restoration or protection may be substantially modified as development occurs.

The wetlands inventory is vital to inform the Basin Planning process to support wetlands protection initiatives. Without detailed knowledge of the quantity, quality and condition of the region's wetlands, it is not possible to make informed decisions about how those resources should be protected.

The CRAM assessment performed under this contract has helped to determine locations of high value riverine wetland resources. This identification could lead to regulatory protections should they be subject to urban encroachment.

In the Basin Plan, the "*tributary rule*" refers only to water quality objectives rather than to the entire water quality standard. The implication is that if there are waters tributary to a wetland that the same standards that apply to the wetland can and should apply to the tributary waters. Subsequent Basin Plan amendments could make it very clear that the tributary rule applies to waters tributary to wetlands in the same manner the objectives of a river apply to its tributary streams. In the 2006 Basin Plan triennial review, Regional Board staff has identified as priority No. 22 the need to revise Basin Plan beneficial use tables to incorporate the tributary rule. This revision could easily be expanded to also clearly apply the tributary rule to wetlands and their tributary watersheds, and to wetlands that are tributary to waters with established water quality standards. . By having a detailed wetlands condition inventory, the Board will be better able to establish meaningful water quality standards (using narrative objectives) for wetlands throughout the region.

8.3.3 Additional language protection in the Basin Plan

One of the tasks outlined as a deliverable for this project included an exploration of additional language protection in Basin Plan with, at least the following programs in mind – a water quality standards program, 401 program, ambient monitoring program, and the 305(b)/303(d) programs. In the 2006 Basin Plan triennial review, priority issue No. 9 (out of 36 priorities) was to develop criteria for wetlands mitigation, to revise the Plan's narrative to expand the plan's definition of wetlands, and to describe the Clean Water Act (CWA) Section 401 water quality standards certification process. Region 8 Staff propose to develop regional criteria for determining appropriate mitigation when wetlands and other Waters of the State are impacted by various construction activities, primarily those involving dredging and filling. Dredging and filling activities are subject to:

- Permits issued by the U.S. Army Corps of Engineers, pursuant to CWA Section 404; and,
- Water quality standards certifications issued by the SWRCB or Regional Board pursuant to CWA Section 401.

In some cases, waste discharge requirements are adopted by the Board for dredge and fill projects. These regulatory actions implement federal and state requirements for “no net loss of wetlands” as a result of land use practices, and state and federal policies encouraging the expansion of existing wetlands and creation of new ones.

Successful mitigation of the loss of wetlands and other Waters of the State depends on a number of factors, including consideration of the condition of the area impacted, and the location of the proposed mitigation (within or outside of the impacted watershed), among others. To develop information needed to further investigate this issue, a comprehensive inventory and assessment of the quality of all wetland resources in Region is needed. This assessment is providing information needed to understand the condition of riverine wetlands in the region, subject to the limitations imposed by the data gaps identified in this report. Additional work will be needed to more fully populate an inventory of all regional wetland resources and assess the condition of these resources.

This project demonstrates that CRAM can be effective to assess riverine wetland condition, at a landscape scale. In Region 8, CRAM should be utilized for all subsequent wetlands assessments. The use of a consistent assessment methodology over time will help to assure that the riverine wetland condition assessments conducted in 2006 can be confidently compared with future wetlands assessments. This is an important consideration if wetland condition assessment data is to be used for monitoring trends in changes in wetland condition.

8.3.4 Discuss recommendations for potential Basin Plan Amendments

Regional Board staff recommend updating the Basin Plan table 3.1 (which lists beneficial uses) and table 4.1 (which lists numeric water quality objectives) to reflect the partially updated inventory of wetlands in the region provided by this project. This is already captured in the 2006 Basin Plan triennial review.

Regional Board staff recommends that the assessment results from this project be utilized by staff to provide information to decision makers to help them understand why change is needed in the manner in which the region’s wetlands resources are managed. This should lead to a process to amend the Basin Plan to comprehensively catalogue the region’s wetland resources, and establish water quality standards for them. These water quality standards could then be utilized in setting effluent limitations for NPDES permits. Wetlands Basin Plan amendments could also be used in a process to identify appropriate mitigation for proposed impacts to wetland resources. This mitigation can then be incorporated into CWA Section 401 water quality standards certifications for projects proposing to dredge, or discharge dredged material into, or to discharge fill into waters of the United States and waters of the state. Wetlands mitigation specifications derived from the Basin Plan wetlands amendments could also be incorporated into waste discharge requirements, as appropriate. These amendments could also support development of regional policy initiatives directed toward minimizing impacts to existing wetland resources. These amendments might also spawn policies that result in restoration or enhancement of previously degraded wetlands that have the potential to achieve the ecological functionality and value associated with healthy wetlands.

Creating a regulatory incentive for restoring degraded wetland resources is another idea that we would like to explore further once all scientific information is digested.

9 CONCLUSIONS

NWI landscape assessments and CRAM condition assessments conducted through this project will be used as a basis for representative characterization of the condition of riverine wetlands in the Santa Ana Region. Future Basin Plan amendments that broaden the Plan’s recognition of the wetland resources of the SAR and SJR Watersheds will include an inventory and discussion of the condition of these wetlands, using the most current data available, including that from this project. This information, along with wetland protection policy in place throughout the state and data concerning other wetland types present in the region, will help to form the background and regional context for possible wetlands Basin Plan

amendments. These amendments will be crafted with language to improve the Regional Board's ability to protect the water quality standards of wetlands within the region, and may include measures focused on preserving, restoring and enhancing wetlands in the region. Since all Basin Plan amendments are subject to review by stakeholders and approving authorities, the data used for them needs to be developed with an appropriately high level of quality control, such that the a data can withstand rigorous scrutiny.

It is expected that upon future work and promulgation of Basin Plan Amendments, that the results obtained from this project will prove useful during the public process. It is anticipated that the Technical Advisory Committee will use this information for commenting on and/or approving the future draft Basin Plan Amendments.

In addition to narrative Basin Plan amendments, examples for future wetlands protection amendments might include establishment of a wetland beneficial use (WETL), and assignment of this use to appropriate waters of the region. CRAM data from this project will likely be used to inform the process of developing a definition for this use. The NWI-based landscape assessment data sets will likely be used for determining waters that WETL will be assigned to. CRAM condition assessments conducted through this project may be appended to the Basin Plan. Other suggestions for how the data could be used for Basin Plan amendments are likely to come from the project's proposed Technical Advisory Committee (TAC). The quality and quantity of wetlands data available to the TAC will be a limiting factor in what guidance the TAC can provide. While the project is expected to provide high quality data assessing the condition of representative riverine wetlands that the TAC can consider, the TAC will not have similar contemporaneous assessment condition data for some of the other wetland types known to be present in the region, such as lacustrine and depressional wetlands.

Region 8 plans to use the information resulting from this assessment to support promulgation of wetland Basin Plan Amendments (BPAs). This project will support future promulgation of Basin Plan wetlands amendments that will create an up-to-date regulatory framework for more effective protection of water quality standards of wetlands within the Santa Ana Region. Once adopted, application of these amendments should lead to reduced loss of wetlands and ecologically effective compensatory mitigation for unavoidable impacts to wetlands resources.

10 REFERENCES

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TABLES

Table 1: USGS 7.5 Minute Quadrangles IN Region 8 and NWI Availability

Quadrangle Name	*NWI**	*Quadrangle Name*	*NWI**
ALBERHILL		MOUNT SAN ANTONIO	
ANAHEIM	**Y**	MT BALDY	
ANZA	**Y**	MURRIETA	
BEAUMONT	**Y**	NEWPORT BEACH	**Y**
BIG BEAR CITY	**Y**	ONTARIO	**Y**
BIG BEAR LAKE		ONYX PEAK	**Y**
BLACK STAR CANYON		ORANGE	
BLACKBURN CANYON	**Y**	PALM VIEW PEAK	**Y**
BUTLER PEAK		PERRIS	
BUTTERFLY PEAK	**Y**	PHELAN	
CABAZON		PRADO DAM	**Y**
CAHUILLA MOUNTAIN	**Y**	REDLANDS	
CAJON	**Y**	RIVERSIDE EAST	
CORONA NORTH	**Y**	RIVERSIDE WEST	
CORONA SOUTH		ROMOLAND	
CUCAMONGA PEAK		SAGE	
DEVORE		SAN BERNARDINO NORTH	
EL CASCO		SAN BERNARDINO SOUTH	
EL TORO		SAN DIMAS	
ELSINORE		SAN GORGONIO MTN	
FAWNSKIN	**Y**	SAN JACINTO	**Y**
FONTANA	**Y**	SAN JACINTO PEAK	**Y**
FOREST FALLS		SAN JUAN CAPISTRANO	
GUASTI	**Y**	SANTIAGO PEAK	
HARRISON MTN		SEAL BEACH	**Y**
HEMET	**Y**	SILVERWOOD LAKE	
IDYLLWILD	**Y**	STEELE PEAK	
KELLER PEAK		SUNNYMEAD	
LA HABRA		TELEGRAPH PEAK	
LAGUNA BEACH	**Y**	TUSTIN	**Y**
LAKE FULMOR	**Y**	WHITTIER	
LAKE MATHEWS		WILDOMAR	**Y**
LAKEVIEW	**Y**	WINCHESTER	
LOS ALAMITOS	**Y**	YORBA LINDA	
MOONRIDGE		YUCAIPA	

** A Y in the NWI column indicates that NWI is available for that quadrangle. A blank value in the NWI column indicates a data gap.*

Table 2: Wetlands in Region 8 Based on Available NWI Data

Wetland Type	***Number of Wetlands***	***Acres***	***km^2***	***%***
Estuarine and Marine Deepwater	8	1748.0	7.1	14.2%
Estuarine and Marine Wetland	40	1898.4	7.7	15.4%
Freshwater Emergent Wetland	188	2408.5	9.7	19.6%
Freshwater Forested/Shrub Wetland	83	500.2	2.0	4.1%
Freshwater Pond	340	603.4	2.4	4.9%
Lake	36	3545.7	14.3	28.8%
Other	88	263.8	1.1	2.1%
Riverine	23	1348.7	5.5	11.0%
Total	***806***	***12316.9***	***49.8***	***100.0%***

Table 3: Available NWI Wetland Distribution and Acreage

Quadrangle Name	*Number of Wetland Polygons**	*Acres*
ANAHEIM	1	0.01
ANZA	16	93.92
BEAUMONT	27	79.10
BIG BEAR CITY	44	1185.53
BLACKBURN CANYON	23	12.30
BUTTERFLY PEAK	18	56.72
CAHUILLA MOUNTAIN	9	16.58
CAJON	1	0.41
CORONA NORTH	1	0.00
FAWNSKIN	42	1882.59
FONTANA	1	0.01
GUASTI	120	343.65
HEMET	24	51.59
IDYLLWILD	80	988.79
LAGUNA BEACH	19	161.70
LAKE FULMOR	21	30.44
LAKEVIEW	5	0.03
LOS ALAMITOS	37	226.36
NEWPORT BEACH	74	2447.64
ONTARIO	72	82.96
ONYX PEAK	15	32.59
PALM VIEW PEAK	13	11.55
PRADO DAM	2	0.01
SAN JACINTO	60	1032.19
SAN JACINTO PEAK	10	11.20
SEAL BEACH	52	2770.20
TUSTIN	43	794.24
WILDOMAR	4	4.58
Total	**834**	**12316.89**

* There are currently 806 wetlands in Region 8 (per Table 2). Some wetland polygons share adjacent quadrangles and are therefore counted in both quadrangles, hence the discrepancy between the totals in this table and Table 2.

Table 4: Terrain parameters for riverine wetlands

	Elevation (ft)	Slope (degrees)
Minimum	0.80	0.00
Maximum	2150.42	46.33
Mean	197.38	3.03
Stdev	248.15	5.14

Table 5: Landuse categories for riverine wetlands

Landuse	***Count****	***Acres***	***%***
Vacant Undifferentiated	32	897.3271	66.56%
Improved Flood Waterways and Structures	28	304.7382	22.60%
Water, Undifferentiated	4	37.1225	2.75%
Undeveloped Regional Parks & Recreation	2	26.4053	1.96%
Mineral Extraction - Other Than Oil and Gas	5	18.8193	1.40%
Mineral Extraction - Oil and Gas	4	18.7922	1.39%
Nurseries	5	8.4482	0.63%
Golf Courses	3	5.1911	0.39%
Freeways and Major Roads	4	4.1208	0.31%
Manufacturing, Assembly, & Industrial	11	3.4054	0.25%
Wholesaling and Warehousing	2	3.1704	0.24%
Liquid Waste Disposal Facilities	1	2.8378	0.21%
Irrigated Cropland and Improved Pasture	4	2.4262	0.18%
Vacant Area	2	2.3297	0.17%
High-Density Single Family Residential	12	1.9301	0.14%
Low-Rise Apartments, Condos, Townhouses	6	1.7136	0.13%
Developed Local Parks and Recreation	4	1.5370	0.11%
Non-Irrigated Cropland & Improved Pasture	3	1.2573	0.09%
Under Construction	1	1.1686	0.09%
Cemeteries	1	1.0306	0.08%
Electrical Power Facilities	3	0.7957	0.06%
Mixed Commercial and Industrial	1	0.5936	0.04%
Retail Centers	1	0.5586	0.04%
Low- and Medium-Rise Major Office Use	3	0.4192	0.03%
Trailer Parks & Mobile Homes High-Density	2	0.4066	0.03%
Senior High Schools	1	0.3603	0.03%
Commercial Recreation	1	0.3566	0.03%
Orchards and Vineyards	3	0.2514	0.02%
Modern Strip Development	1	0.1657	0.01%
Other Open Space and Recreation	1	0.1616	0.01%
Commercial Storage	1	0.1322	0.01%
Open Storage	1	0.0796	0.01%
Medium-Rise Apartments & Condominiums	1	0.0748	0.01%
Low-Density Single Family Residential	1	0.0025	0.00%
*Count refers to the number of wetland polygons contained in that particular Landuse category.			

Table 6: Sites selected for CRAM Analysis

SITEID	CATEGORY	Longitude DD	Latitude DD
CAS04476-011	SA_0-350	-117.78352517	33.850751000
CAS04476-012	SA_0-350	-117.81995033	33.919145069
CAS04476-015	SA_0-350	-117.68321695	33.892216066
CAS04476-019	SA_0-350	-117.61286303	33.911511385
CAS04476-042	SA_0-350	-117.61435352	33.945867213
CAS04476-046	SA_0-350	-117.71671396	33.792624077
CAS04476-071	SA_0-350	-117.67537558	33.748189466
CAS04476-017	SA_350-700	-117.36382035	34.161176725
CAS04476-028	SA_350-700	-117.44504460	34.203004484
CAS04476-032	SA_350-700	-117.08738209	34.077298499
CAS04476-051	SA_350-700	-117.15384395	33.995912140
CAS04476-055	SA_350-700	-117.22004775	34.039247797
CAS04476-079	SA_350-700	-117.40595247	34.219556993
CAS04476-085	SA_350-700	-117.23309791	34.049964960
CAS04476-002	SA_700+	-117.06210253	34.144227205
CAS04476-007	SA_700+	-116.96380672	34.094982144
CAS04476-014	SA_700+	-117.62619063	34.183644702
CAS04476-022	SA_700+	-116.87148271	34.158421091
CAS04476-027	SA_700+	-117.47032066	34.306522607
CAS04476-034	SA_700+	-116.93008031	34.089394000
CAS04476-035	SA_700+	-116.87489914	34.077479169
CAS04476-095	SJ_350-700	-117.09649019	33.830715336
CAS04476-116	SJ_350-700	-117.27871316	33.664073369
CAS04476-130	SJ_350-700	-117.02225881	33.728110331
CAS04476-160	SJ_350-700	-116.81068772	33.731419450
CAS04476-243	SJ_350-700	-117.20906791	33.829108898
CAS04476-331	SJ_350-700	-117.23341205	33.745602791
CAS04476-347	SJ_350-700	-116.99166922	33.845882299
CAS04476-020	SJ_700+	-116.68733438	33.768420077
CAS04476-070	SJ_700+	-116.76762278	33.771511380
CAS04476-172	SJ_700+	-116.83797267	33.784315302
CAS04476-206	SJ_700+	-116.74231339	33.731890431
CAS04476-286	SJ_700+	-116.81659916	33.653887189
CAS04476-484	SJ_700+	-116.82052651	33.659625124
CAS04476-612	SJ_700+	-116.83476442	33.675115290

Table 7: CRAM metrics for preliminary scores prior to the site visit

Background Information to Assemble Prior to the Site Visit		
• 1m -3m pixel resolution digital geo-rectified site imagery • Site-specific and neighboring reports on hydrology, ecology, chemistry, etc. • Access permission if needed • Preliminary map of the Assessment Area • Maps to the site, access points, and other logistical information		
Metrics Suitable for Preliminary Scoring Prior to Site Visit		
Attributes	**Metrics**	**Suitable?**
Buffer and Landscape Context	Landscape Connectivity	Yes
	Percent of Wetland with Buffer	Yes
	Average Buffer Width	Yes
Hydrology	Sources of Water	Yes
	Hydrologic Connectivity	Yes

Source: Partial Table 3.7 from CRAM Manual, v. 4.2.0 – Collins, et al. 2006

Table 8: CRAM Site Attributes and Metrics

Attributes		Metrics
1. Buffer and Landscape Context		1a. Landscape Connectivity
		1b. Percent of AA with Buffer
		1c. Average Buffer Width
		1d. Buffer Condition
2. Hydrology		2a. Water Source
		2b. Hydroperiod or Channel Stability
		2c. Hydrologic Connectivity
Structure	3. Physical	3a. Structural Patch Richness
		3b. Topographic Complexity
	4. Biotic	4a. Organic Matter Accumulation
		4b. Interspersion and Zonation
		4c. Number of Plant Layers Present
		4d. Percent of Layers Dominated by Native Species
		4e. Number of Co-dominant Species
		4f. Percent of Co-dominant Species that are Native
		4g. Vertical Biotic Structure

Source: Table 2.2 in CRAM 4.1

Table 9: CRAM Data Stressors – Hydrology

HYDROLOGY
Point Source (PS) Discharges (POTW, other non-stormwater discharge)
Non-point Source (Non-PS) Discharges (urban runoff, farm drainage)
Flow diversions or unnatural inflows
Dams (reservoirs, detention basins, recharge basins)
Flow obstructions (culverts, paved stream crossings)
Weir/drop structure, tide gates
Dredged inlet/channel
Engineered channel (riprap, armored channel bank, bed)
Dike/levees
Groundwater extraction
Ditches (borrow, agricultural drainage, mosquito control, etc.)

Table 10: CRAM Data Stressors – Physical Structure

PHYSICAL STRUCTURE
Filling or dumping of sediment or soils **(N/A for restoration areas)**
Grading/ compaction **(N/A for restoration areas)**
Plowing/Discing **(N/A for restoration areas)**
Resource extraction (sediment, gravel, oil and/or gas)
Vegetation management
Excessive sediment or organic debris from watershed
Excessive runoff from watershed
Nutrient impaired (PS or Non-PS pollution)
Heavy metal impaired (PS or Non-PS pollution)
Pesticides or trace organics impaired (PS or Non-PS pollution)
Bacteria and pathogens impaired (PS or Non-PS pollution)
Trash or refuse

Table 11: CRAM Data Stressors – Biotic Structure

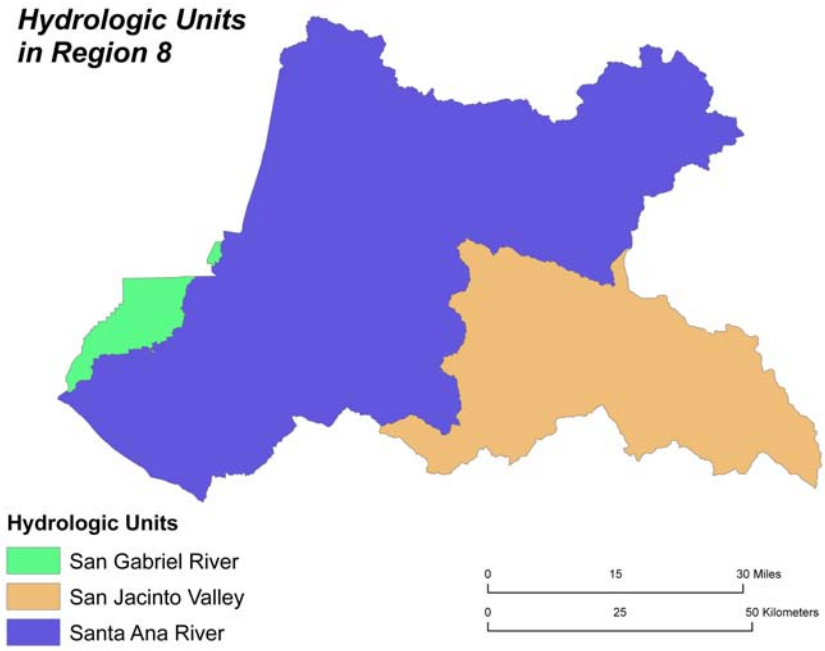
BIOTIC STRUCTURE
Mowing, grazing, excessive herbivory (within AA)
Excessive human visitation
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators (e.g., feral pets)
Tree cutting/sapling removal
Removal of woody debris
Treatment of non-native and nuisance plant species
Pesticide application or vector control
Evidence of fire
Evidence of flood
Biological resource extraction or stocking (fisheries, aquaculture)
Excessive organic debris in matrix (for vernal pools)
Lack of vegetation management to conserve natural resources
Lack of appropriate treatment of invasive plant species adjacent to AA or buffer

Table 12: CRAM Data Stressors – Adjacent Land Use

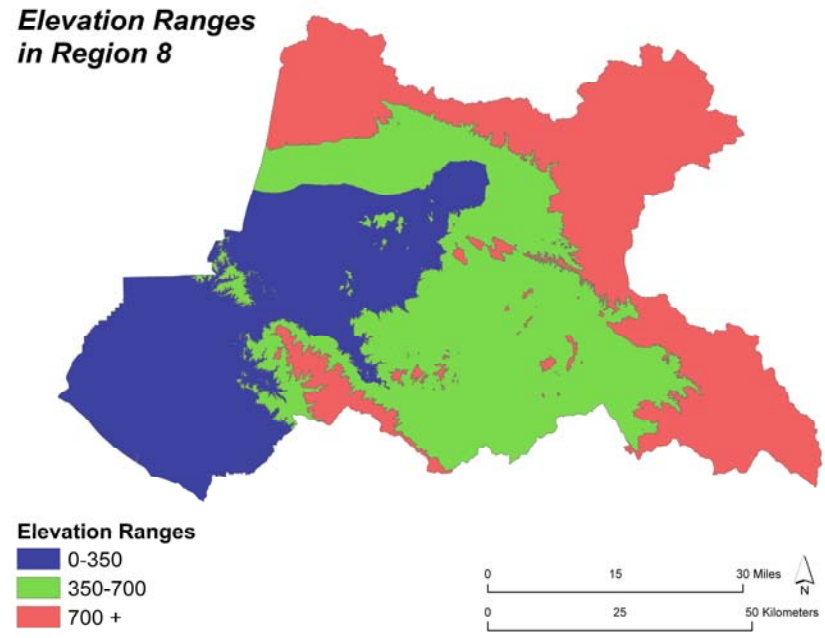
ADJACENT LAND USE
Urban residential
Industrial/commercial
Military training/Air traffic
Dryland farming
Intensive row-crop agriculture
Orchards/nurseries
Commercial feedlots
Dairies
Ranching (enclosed livestock grazing or horse paddock or feedlot)
Transportation corridor
Rangeland (livestock rangeland also managed for native vegetation)
Sports fields and urban parklands (golf courses, soccer fields, etc.)
Passive recreation (bird-watching, hiking, etc.)
Active recreation (off-road vehicles, mountain biking, hunting, fishing)
Physical resource extraction (rock, sediment, oil/gas)
Biological resource extraction (aquaculture, commercial fisheries)

FIGURES

Figure 1: Map of the SARWQCB Region 8



a.



b.

Figure 2: Hydrologic Units (a) and Elevation Ranges (b) in Region 8

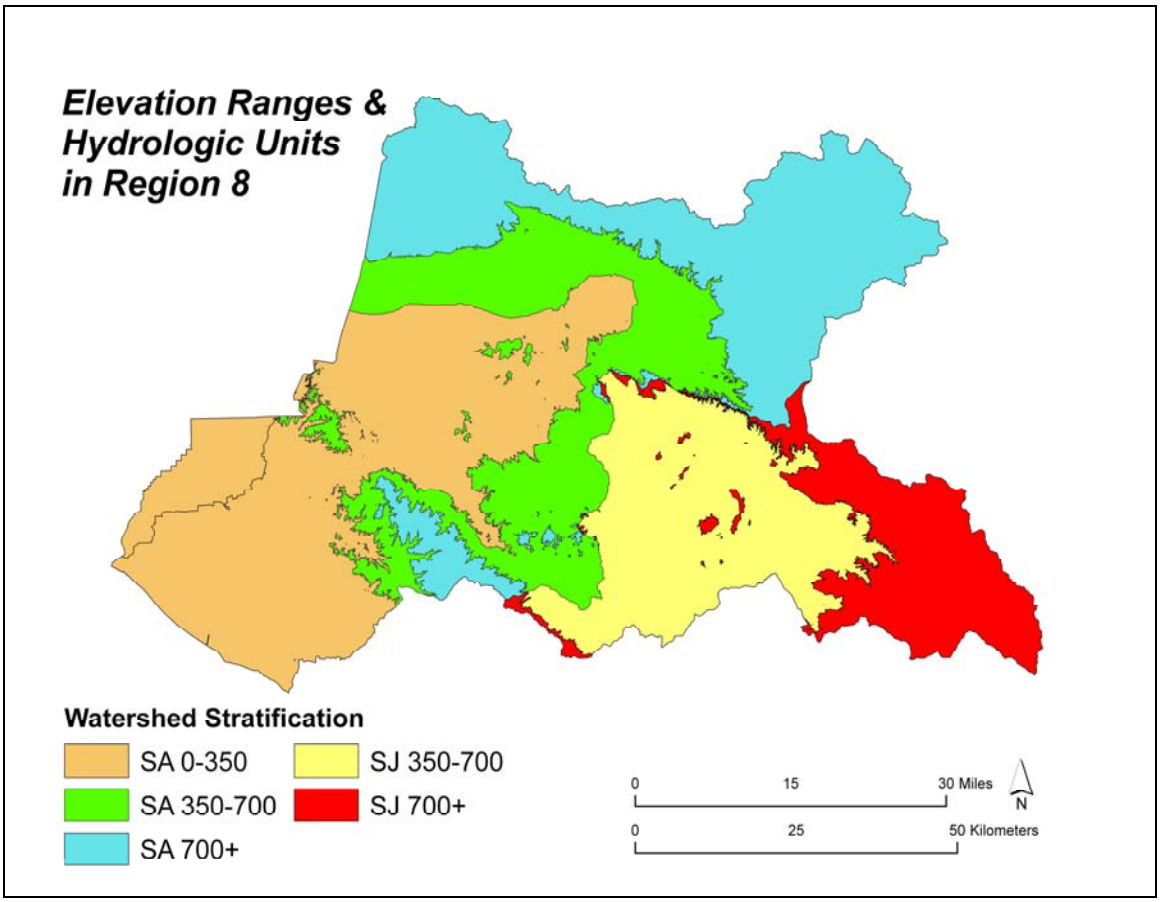


Figure 3: Stratification by hydrologic unit and elevation range

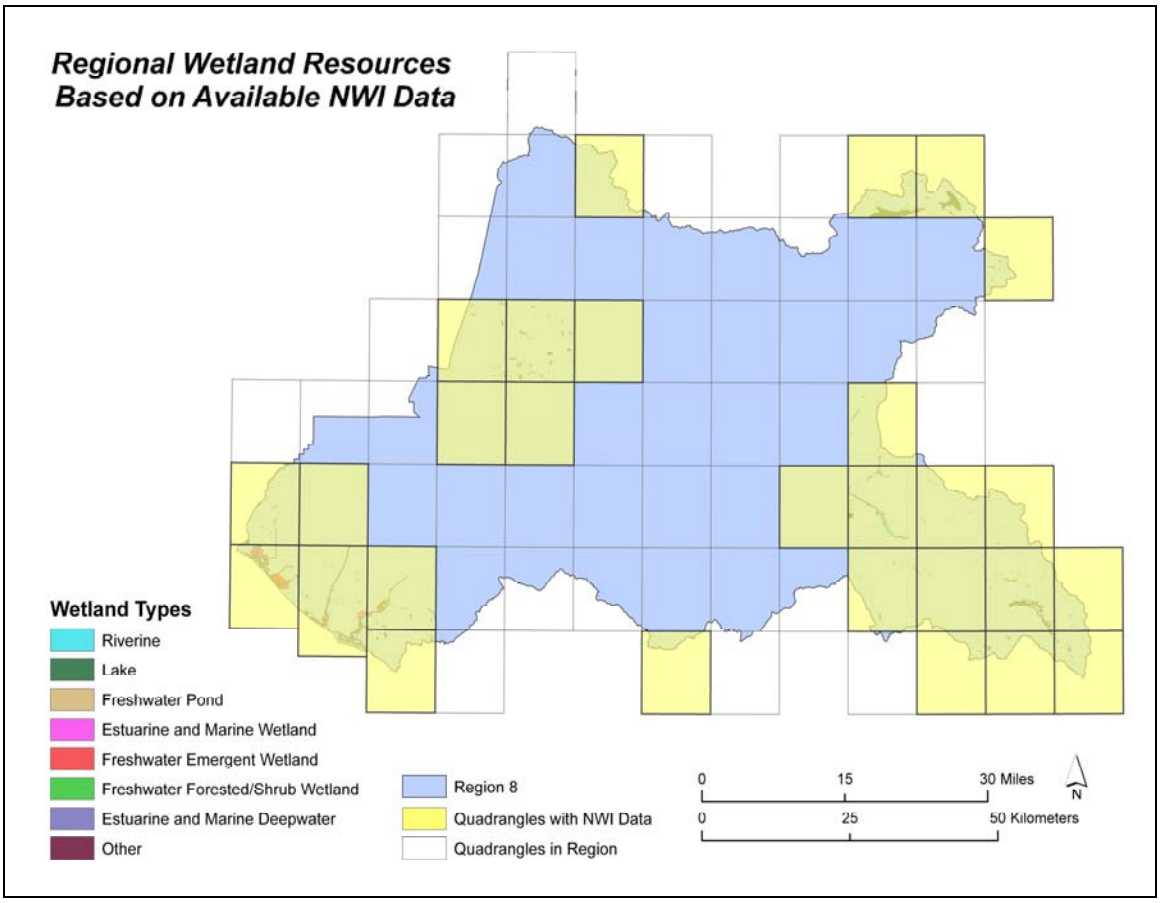


Figure 4: NWI Wetland Data Availability

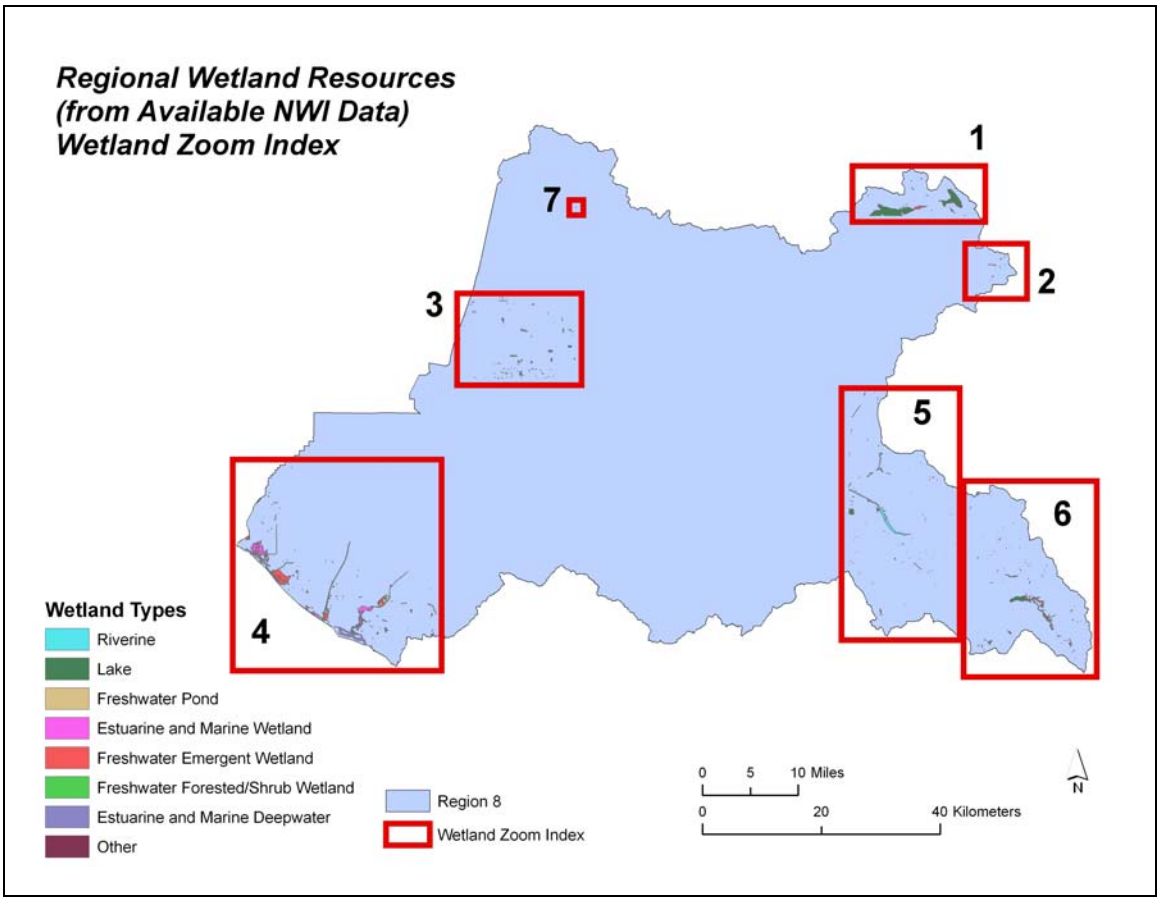


Figure 5: NWI wetland resources and index for zoom areas

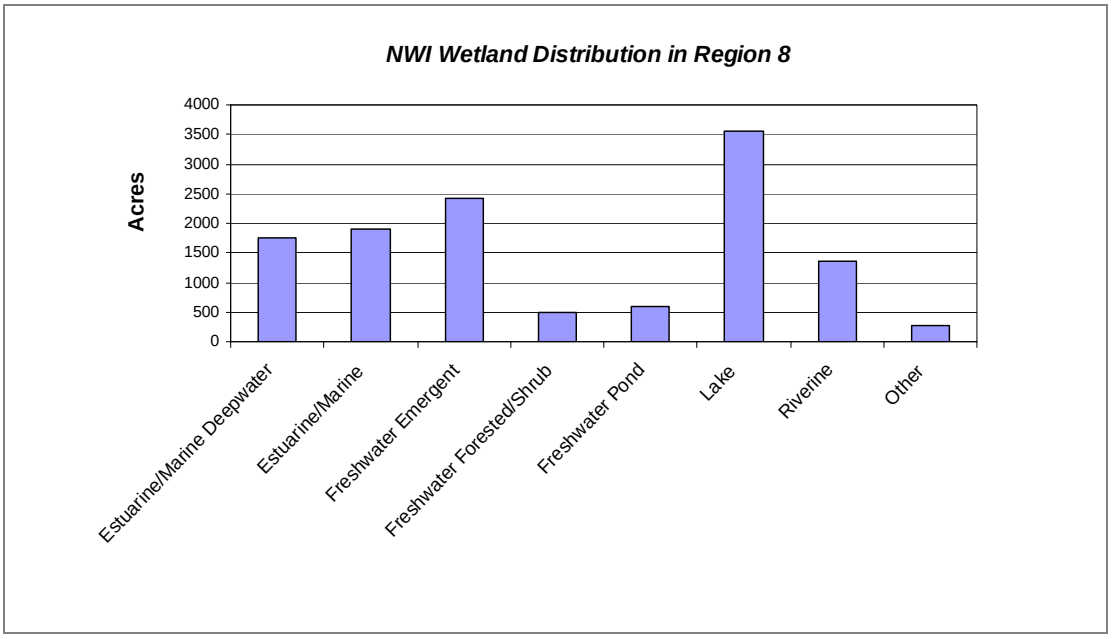


Figure 6: NWI Wetland Distribution in Region 8 Based on Available data

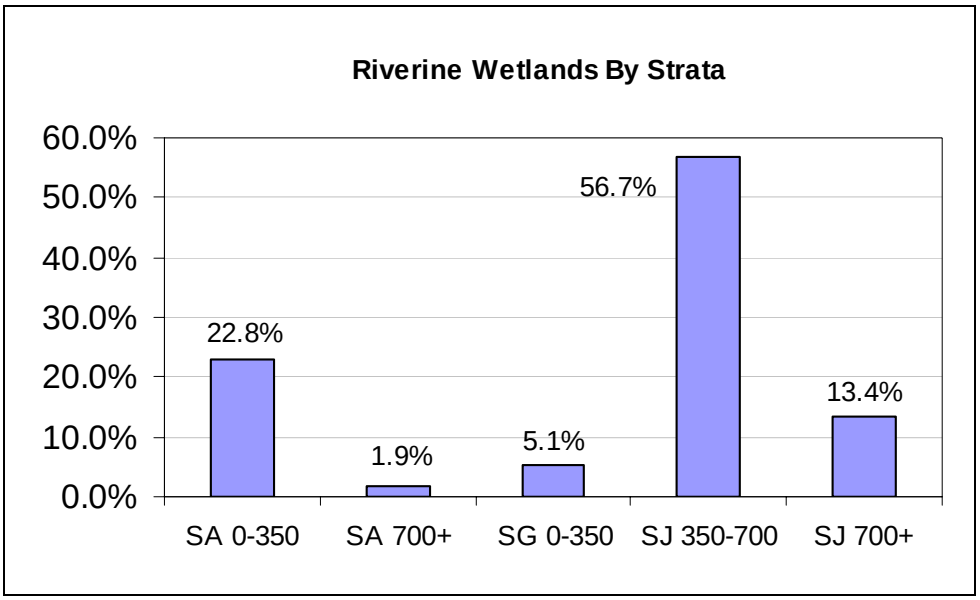


Figure 7: Riverine wetlands by hydrologic unit and elevation range

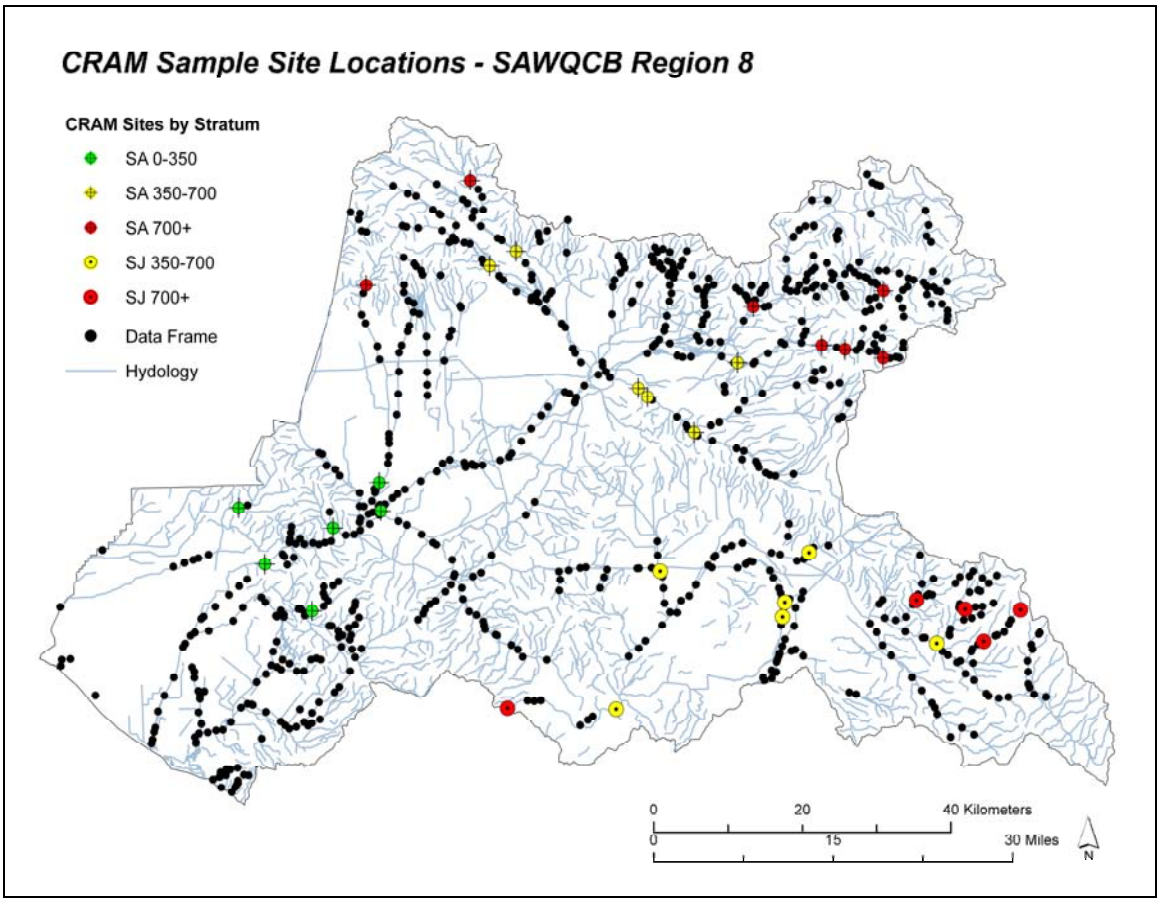


Figure 8: Data frame and CRAM sample site locations

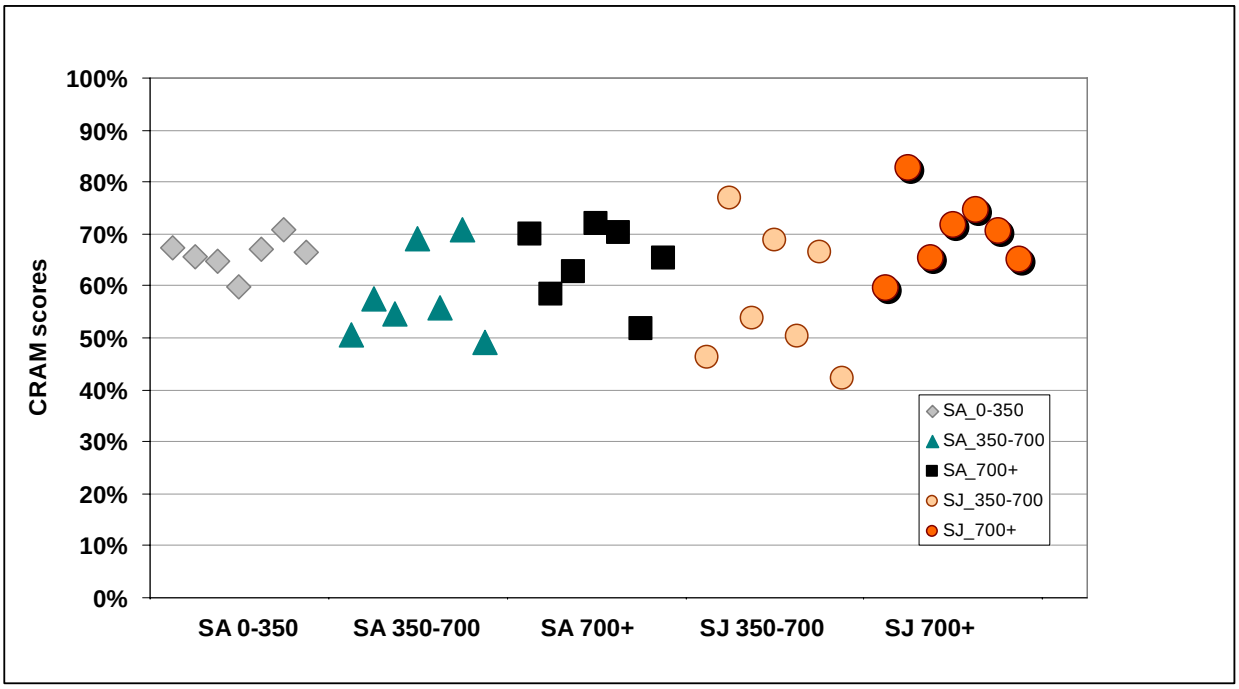


Figure 9: Santa Ana and San Jacinto Wetland CRAM Scores

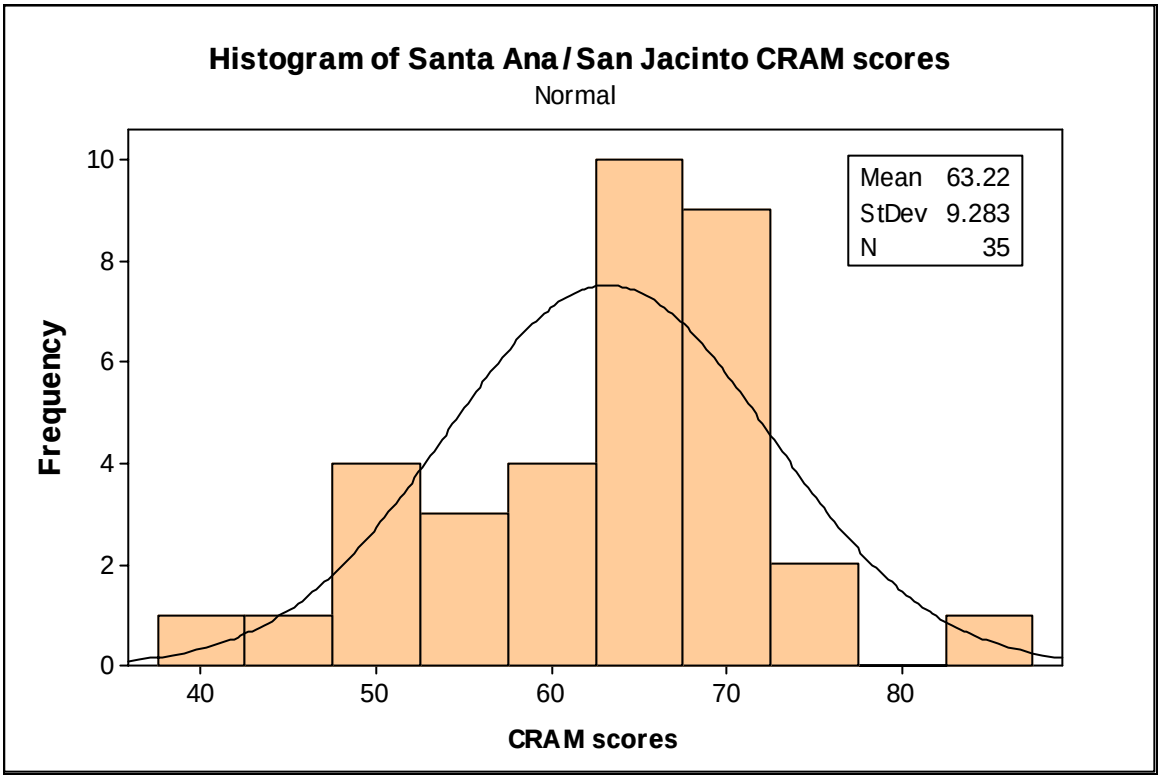


Figure 10: Histogram of Santa Ana/San Jacinto wetland CRAM Scores

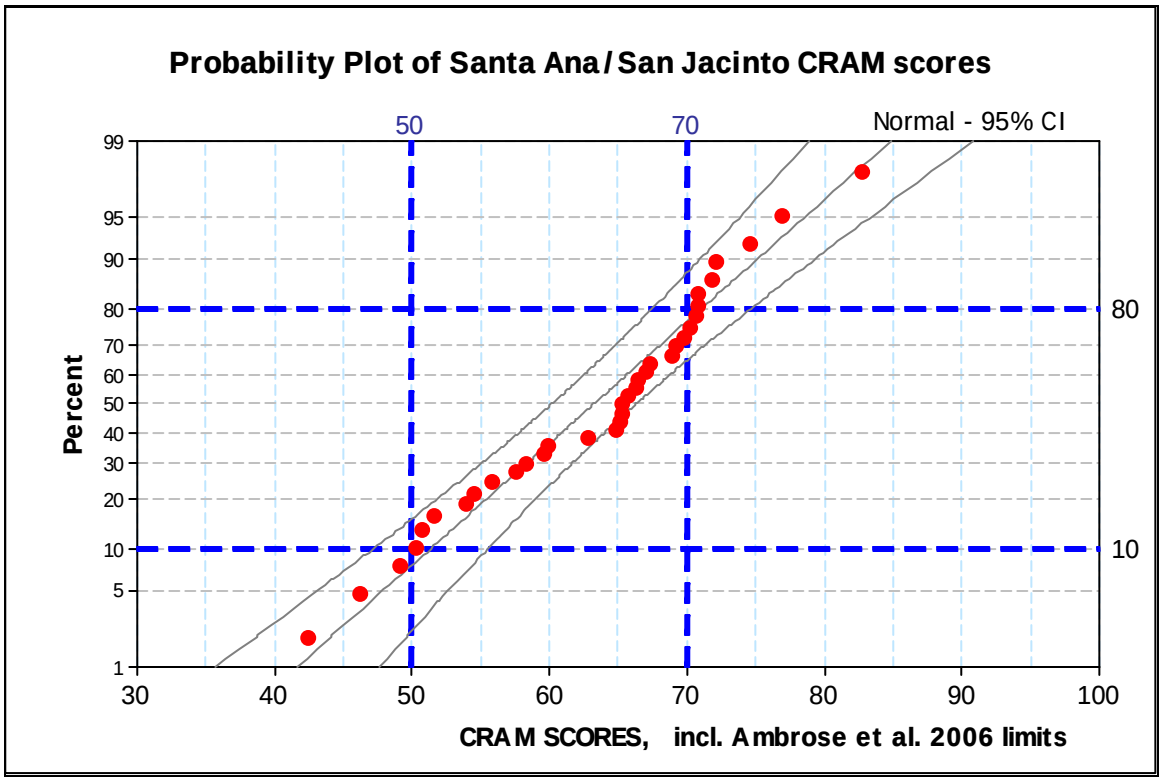


Figure 11: Probability Plot of CRAM Scores with 2006 Quality Limits.
Quality CRAM ranges were based on ranges used for evaluating mitigation projects in California. Cut off CRAM score levels used: 50% and 70% (Ambrose et al. 2006).

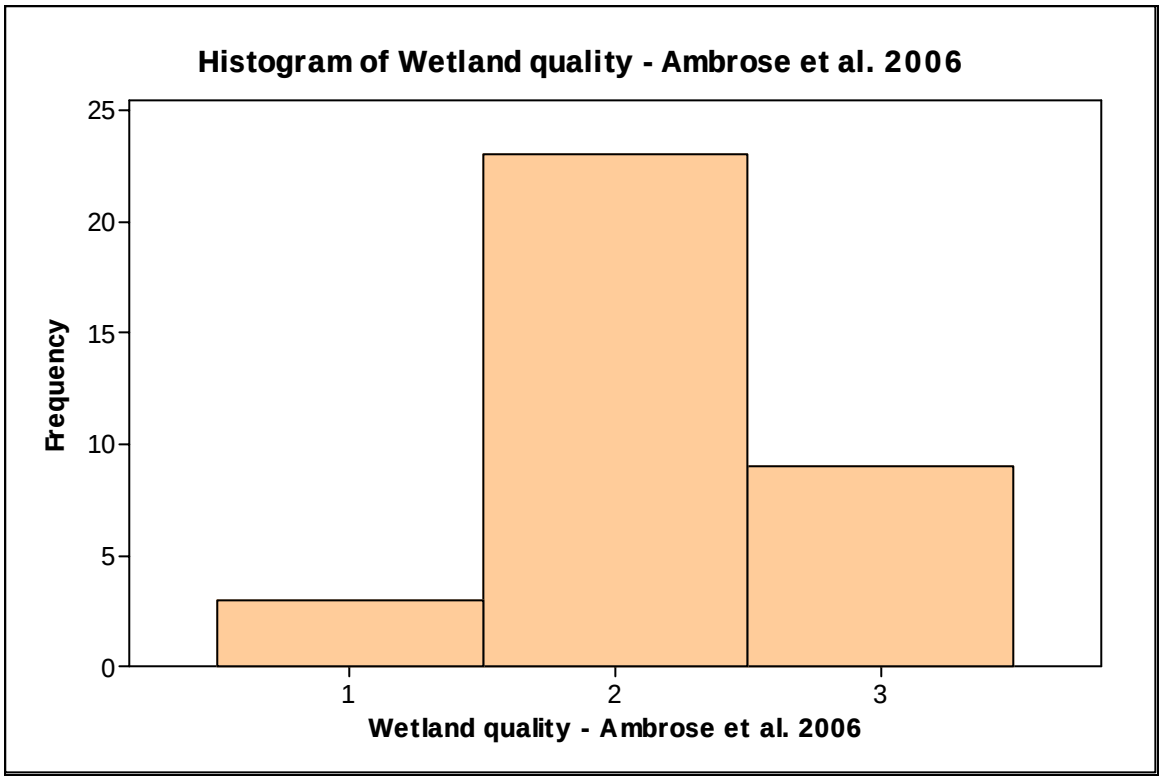


Figure 13: Distribution of CRAM scores over CRAM wetland quality ranges.
The quality ranges were based on ranges used for evaluating mitigation projects in California. 3 = Complete mitigation success ~ High quality wetland; 2 = Partial mitigation success ~ Medium wetland quality; 1 = Failed mitigation project ~ Low quality wetland. Cut off CRAM score levels used: 50% and 70% (Ambrose et al. 2006).

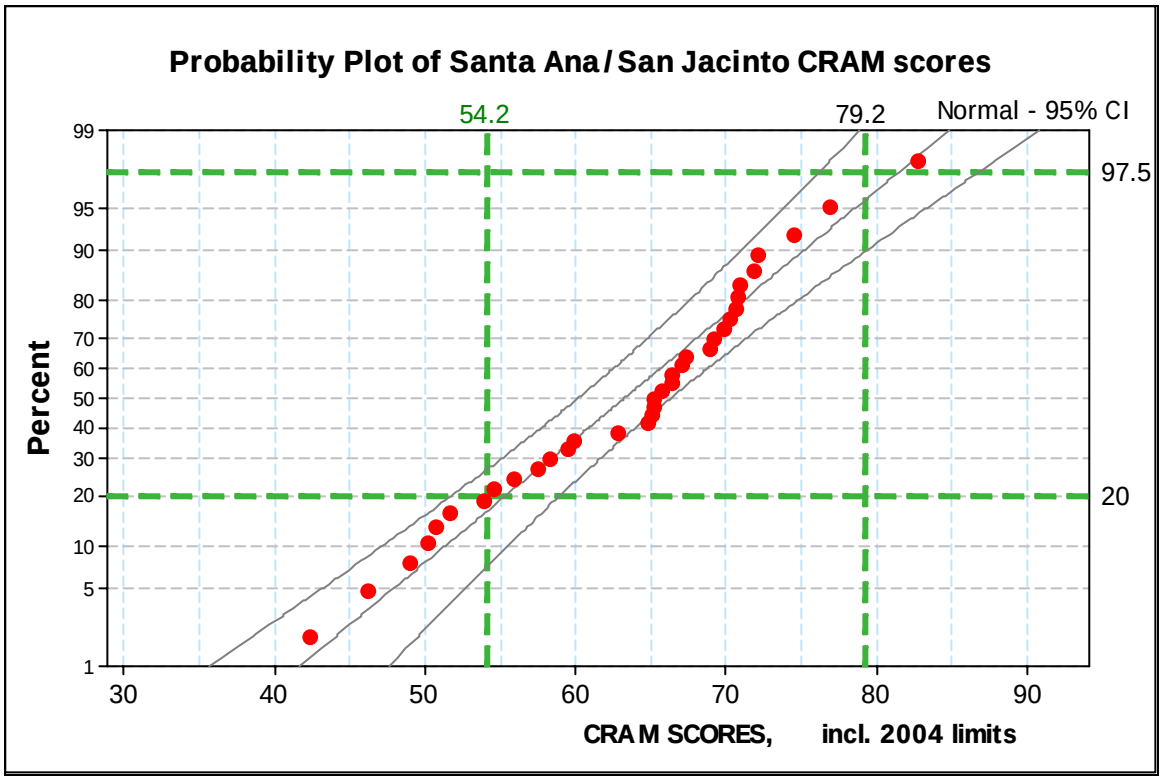


Figure 12: Probability Plot of CRAM Scores with 2004 Quality Limits.
Quality CRAM ranges were based on ranges used for evaluating mitigation projects in California. Cut off CRAM score levels used: 54.2% and 79.2% (Ambrose and Lee, 2004 and Quigly et al. 2006).

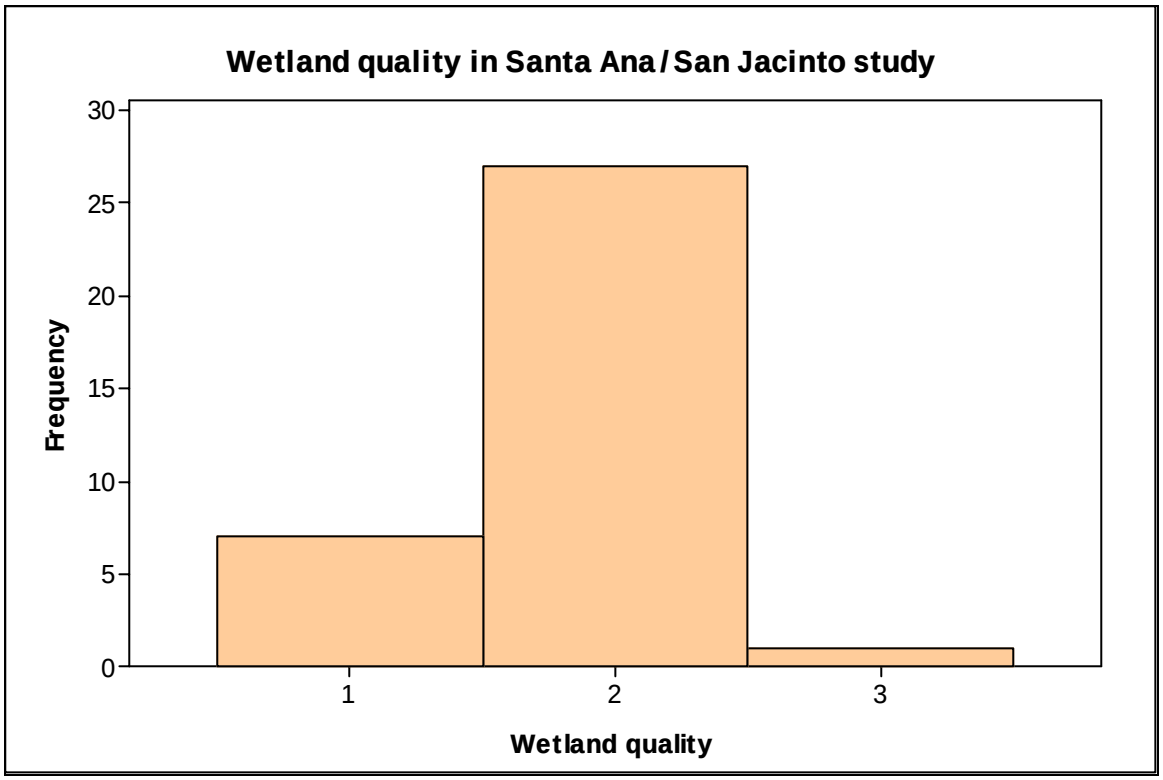


Figure 14: Distribution of CRAM scores over CRAM wetland quality ranges.
The quality ranges were based on ranges used for evaluating mitigation projects in California. 3 = Complete mitigation success ~ High quality wetland; 2 = Partial mitigation success ~ Medium wetland quality; 1 = Failed mitigation project ~ Low quality wetland. Cut off CRAM score levels used: 54.2% and 79.2% (Ambrose and Lee, 2004 and Quigly et al. 2006).

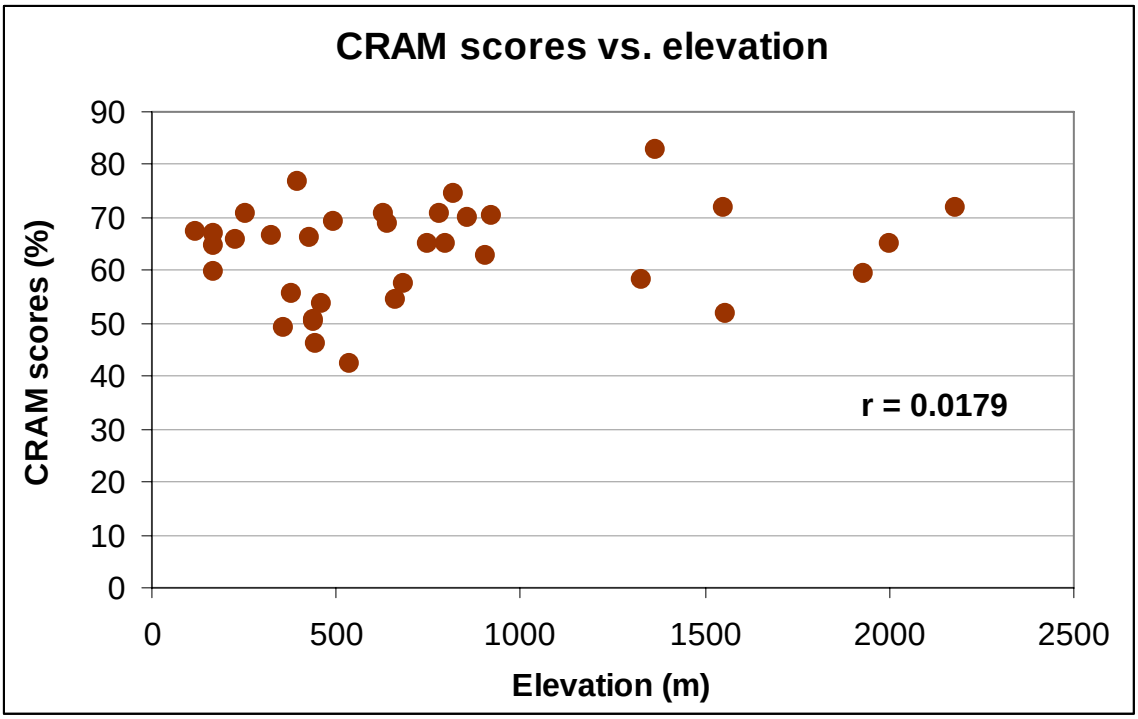


Figure 15: Santa Ana/San Jacinto riverine site CRAM scores vs. site elevation.

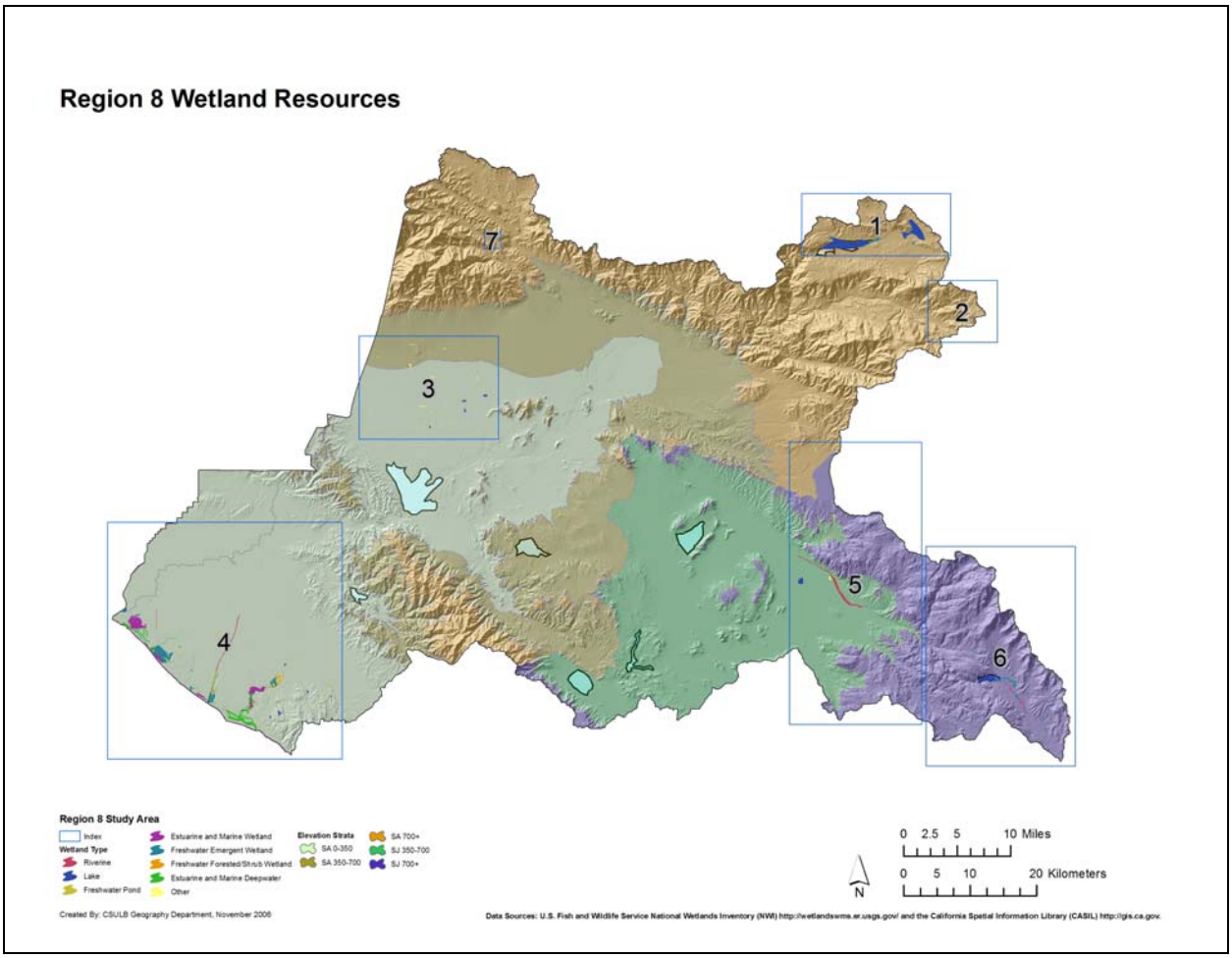
APPENDICES

Appendix A: Regional Maps of wetland resources and CRAM locations

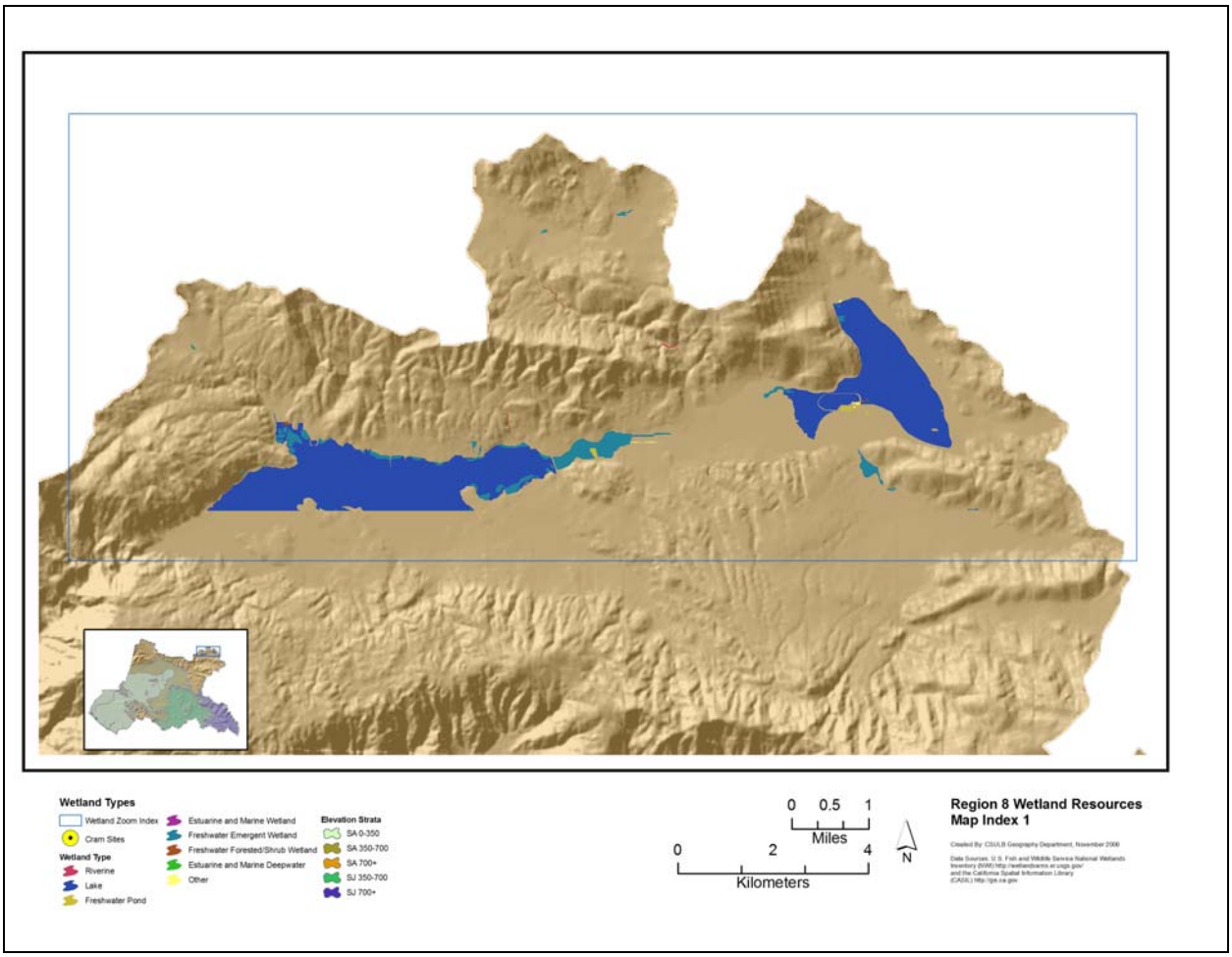
The maps contained in this Appendix are based on available NWI data as detailed in this Report (please refer to Section 4, Table 1 and Figure 4). The wetland resources concentrate in seven areas. Each of these areas was identified by a “box” and are outlined on and Index Map (Map 1). The subsequent seven maps zoom in to each of the seven zoom areas to further detail the wetland resources in those parts of Region 8. The final map provides an overall view of the study area and CRAM site locations.

Map 1: Index Map of Wetland Resources in the Region 8 Study Area
Map 2: Wetland Resources in Index Area Number 1
Map 3: Wetland Resources in Index Area Number 2
Map 4: Wetland Resources in Index Area Number 3
Map 5: Wetland Resources in Index Area Number 4
Map 6: Wetland Resources in Index Area Number 5
Map 7: Wetland Resources in Index Area Number 6
Map 8: Wetland Resources in Index Area Number 7
Map 9: Region 8 Study Area and CRAM Sites

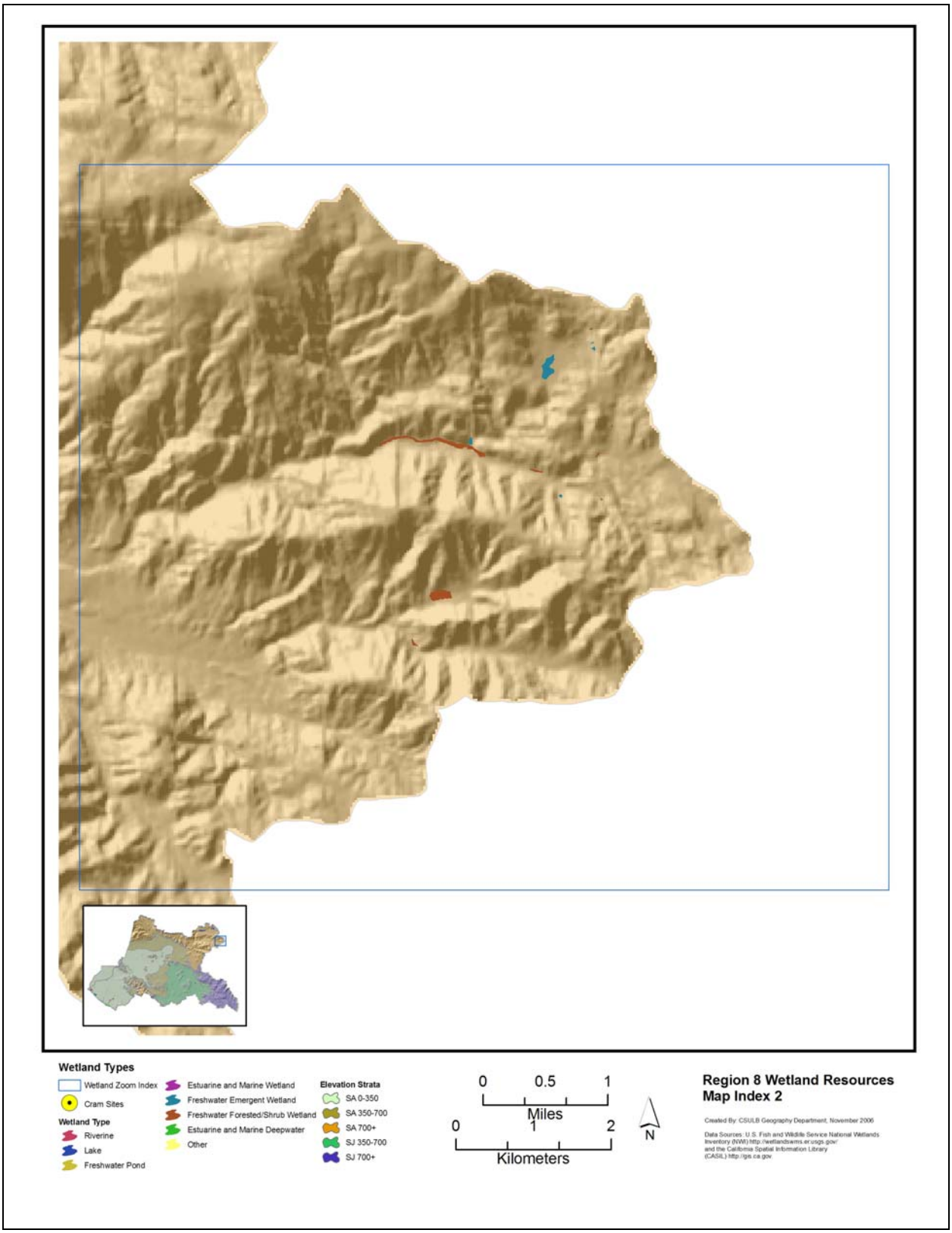
Table A1 breaks down the wetland resources in each of these Index areas (Map 1). The index designed for these maps covers almost all of the wetlands in the region. However, four (4) wetland polygons were excluded from the indexed areas (approximately 9.8 acres).



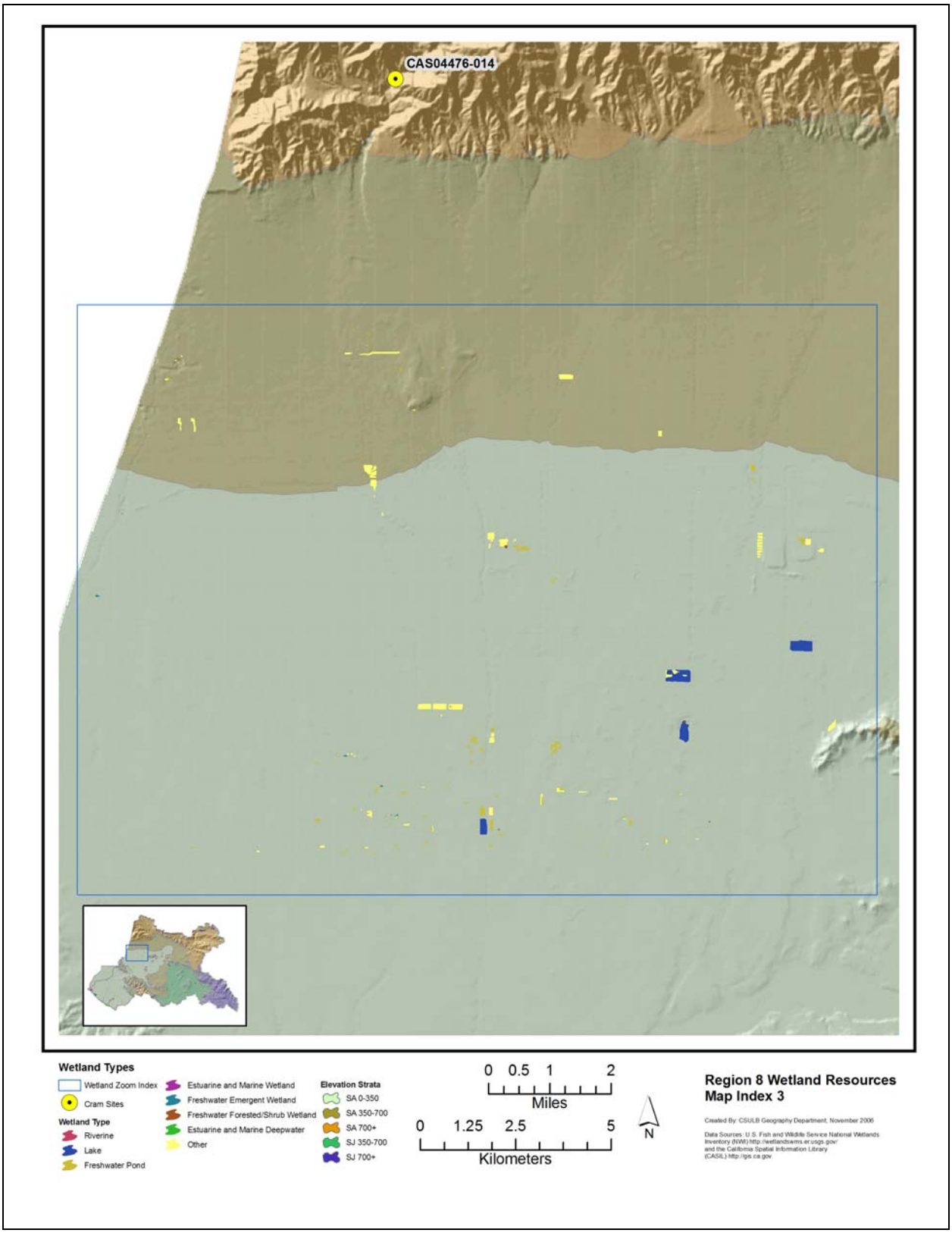
Map 1: Index Map of Wetland Resources in the Region 8 Study Area



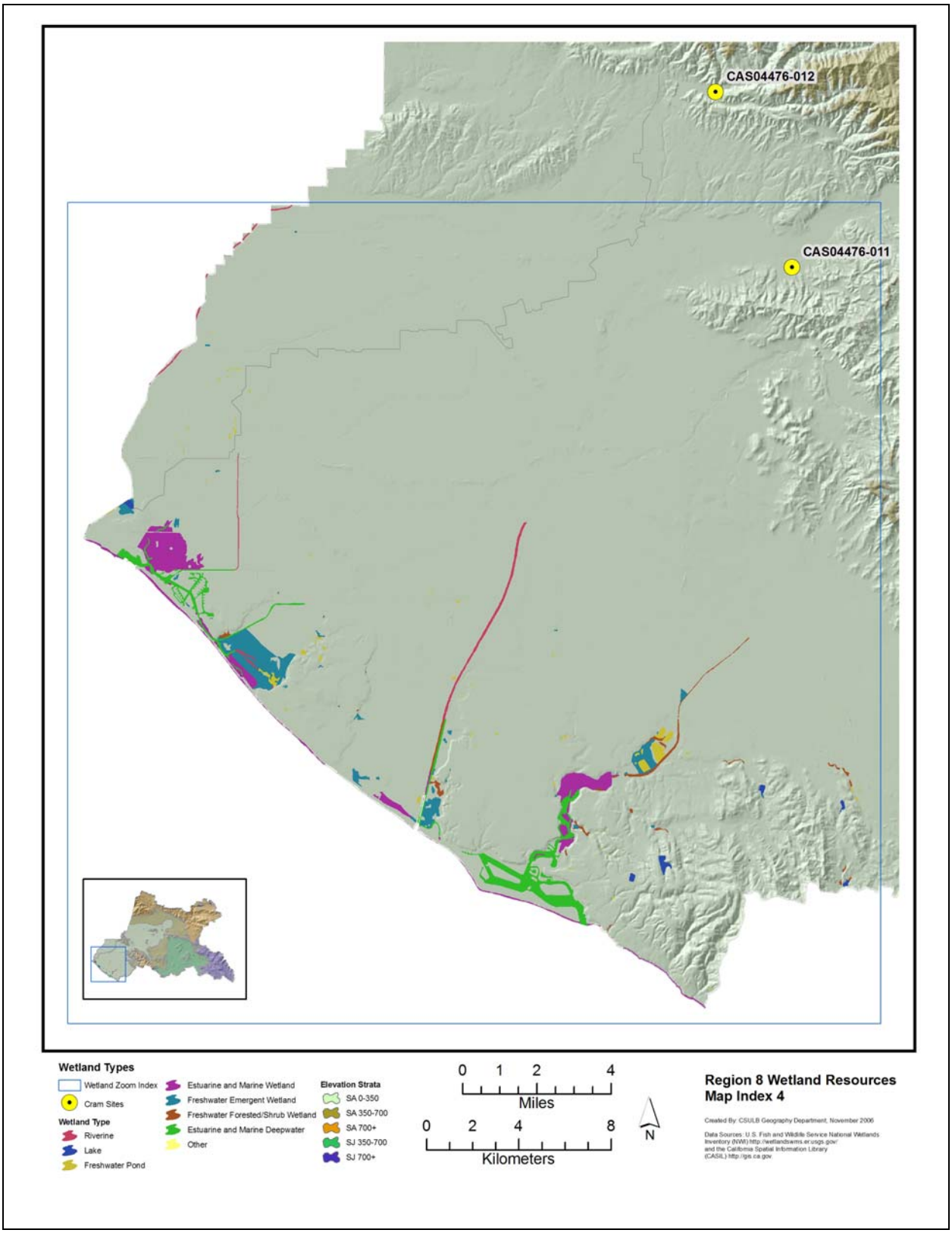
Map 2: Wetland Resources in Index Area Number 1



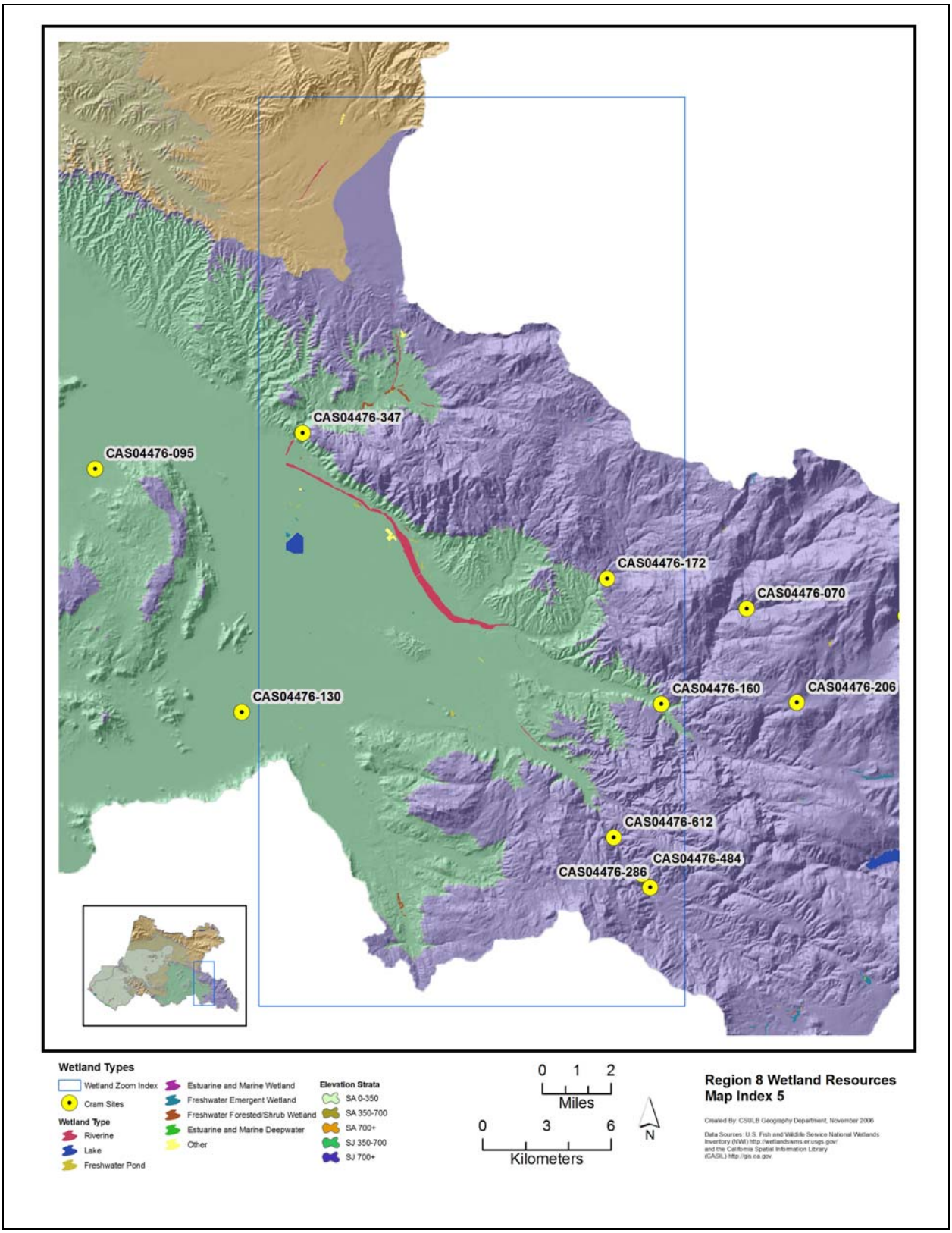
Map 3: Wetland Resources in Index Area Number 2



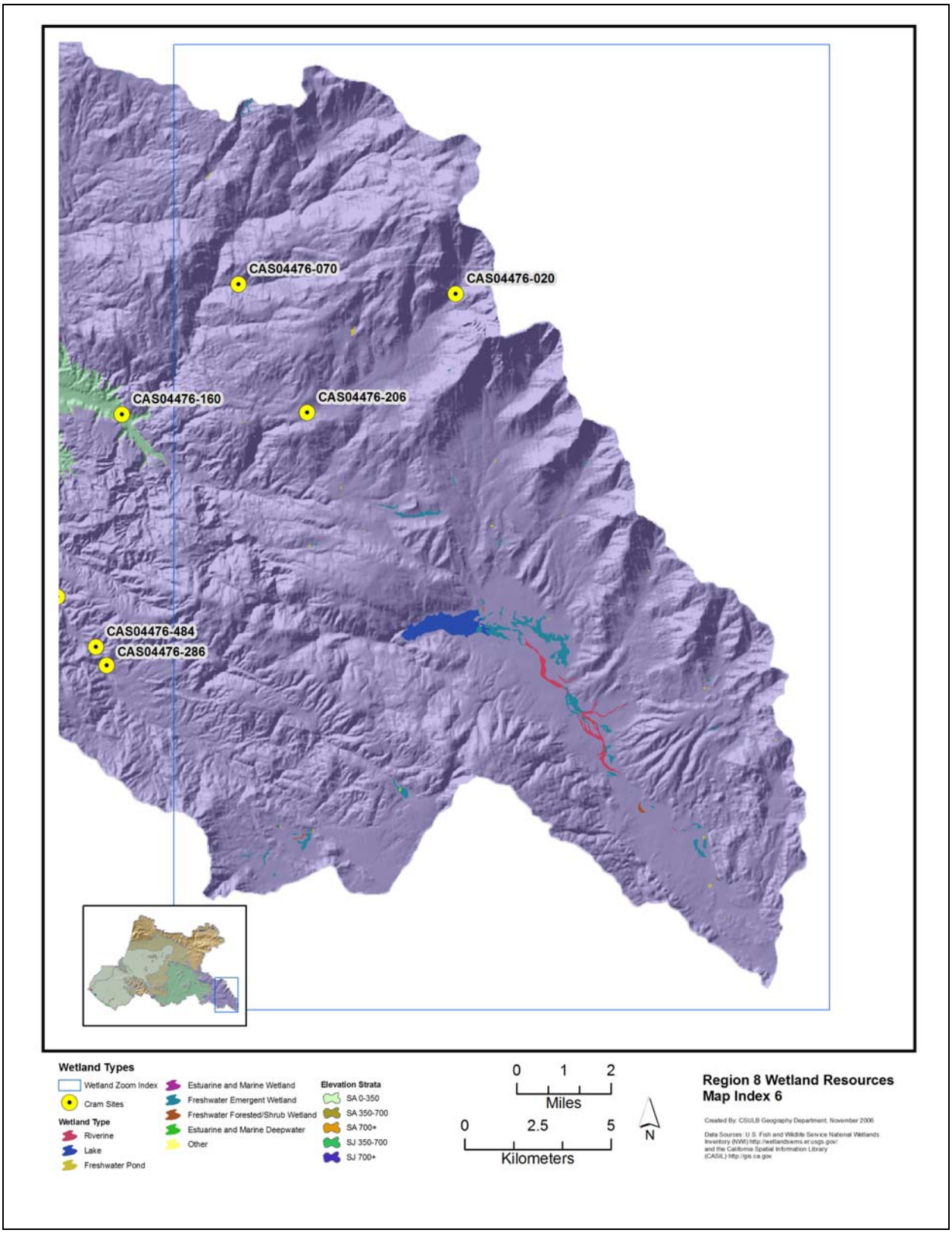
Map 4: Wetland Resources in Index Area Number 3



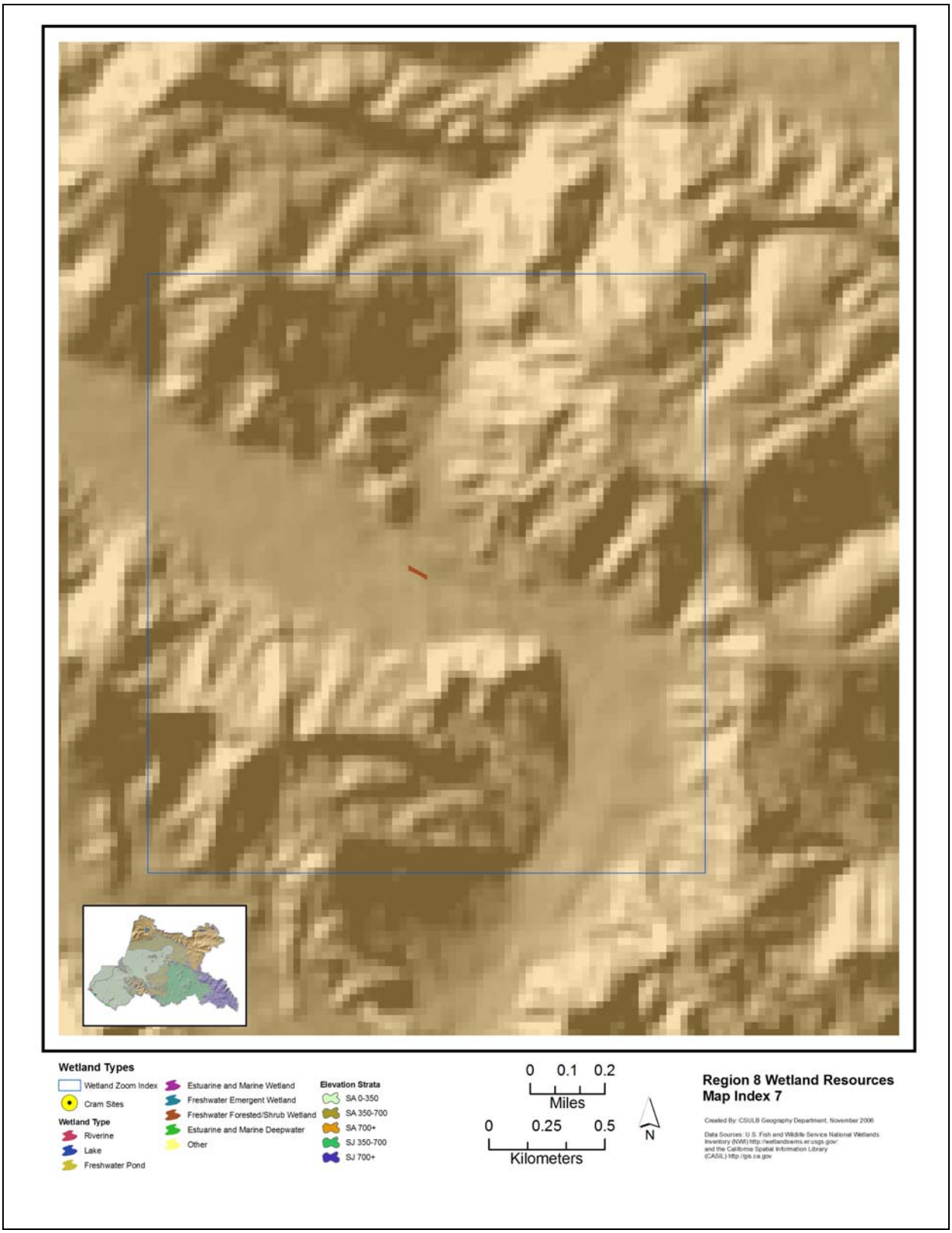
Map 5: Wetland Resources in Index Area Number 4



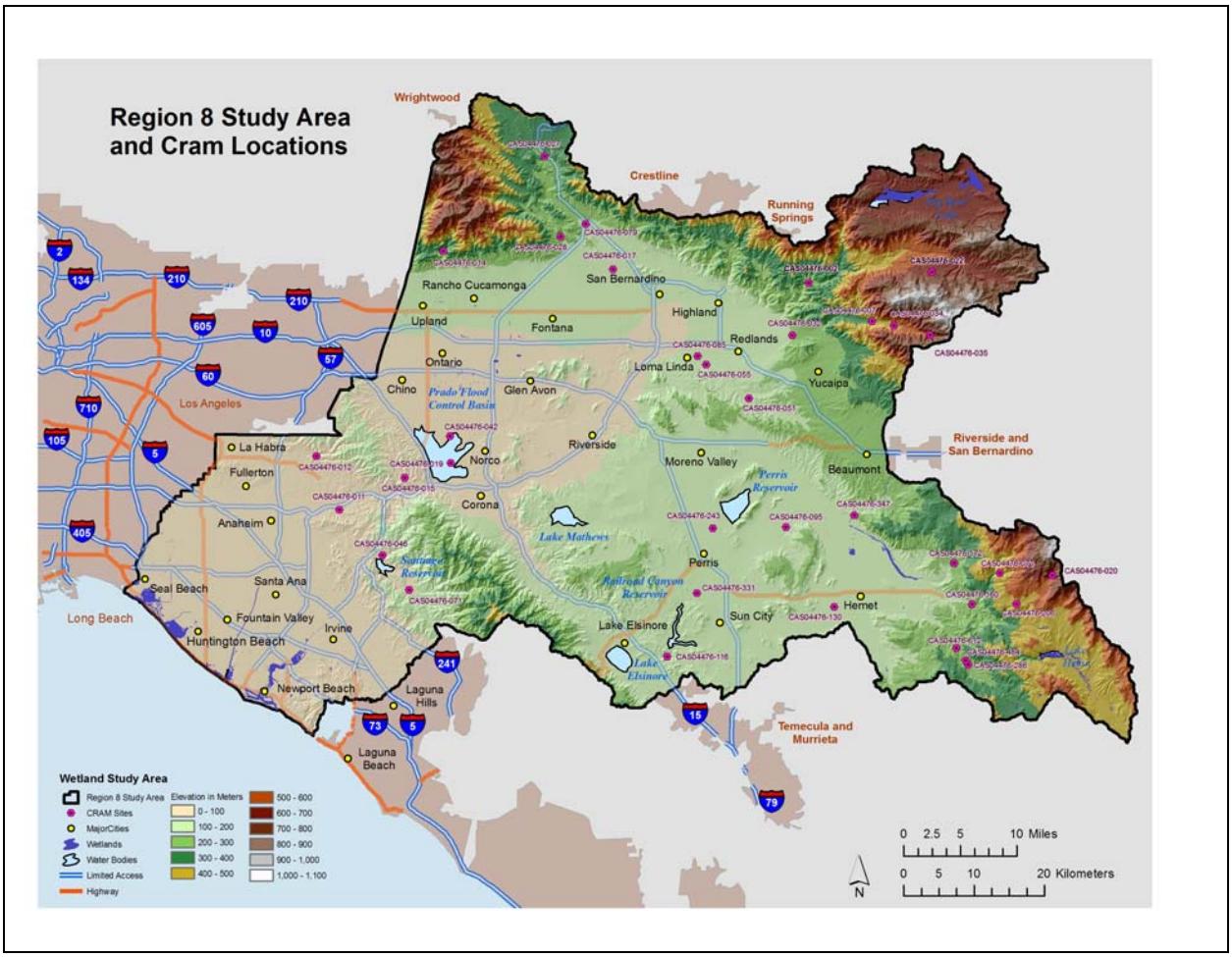
Map 6: Wetland Resources in Index Area Number 5



Map 7: Wetland Resources in Index Area Number 6



Map 8: Wetland Resources in Index Area Number 7



Map 9: Region 8 Study Area and CRAM Sites

Table A1: Wetland Resources by Index Area in Region 8

Index 1: Wetland Type	***Count***	***Acres***
Freshwater Emergent Wetland	43	310.92
Freshwater Forested/Shrub Wetland	7	8.93
Freshwater Pond	13	11.35
Lake	10	2728.22
Other	8	4.90
Riverine	1	2.49
Index 2: Wetland Type	***Count***	***Acres***
Freshwater Emergent Wetland	5	9.50
Freshwater Forested/Shrub Wetla	9	23.02
Freshwater Pond	1	0.05
Index 3: Wetland Type	***Count***	***Acres***
Freshwater Emergent Wetland	7	3.39
Freshwater Forested/Shrub Wetla	3	2.52
Freshwater Pond	99	95.69
Lake	10	124.68
Other	69	199.80
Riverine	1	0.38
Index 4: Wetland Type	***Count***	***Acres***
Estuarine and Marine Deepwater	8	1747.22
Estuarine and Marine Wetland	40	1897.62
Freshwater Emergent Wetland	43	1493.55
Freshwater Forested/Shrub Wetland	28	352.47
Freshwater Pond	88	383.46
Lake	6	147.18
Riverine	7	375.92
Index 5: Wetland Type	***Count***	***Acres***
Freshwater Emergent Wetland	12	23.79
Freshwater Forested/Shrub Wetla	22	93.42
Freshwater Pond	87	71.18
Lake	1	149.77
Other	11	59.04
Riverine	10	790.19
Index 6: Wetland Type	***Count***	***Acres***
Freshwater Emergent Wetland	77	564.45
Freshwater Forested/Shrub Wetla	13	19.21
Freshwater Pond	49	38.80
Lake	9	394.35
Riverine	4	179.19
Index 7: Wetland Type	***Count***	***Acres***
Freshwater Forested/Shrub Wetland	1	0.41
TOTAL	***802***	***12307.06***

Table A1 breaks down the wetland resources in each of these Index areas (Map 1). The index designed for these maps covers almost all of the wetlands in the region. However, four (4) wetland polygons were excluded from the indexed areas (approximately 9.8 acres).

Appendix B: Sample Data Frame and Reconnaissance for Site Selection

Status Code: 1=sampled; 2=viable; 3=permission required; 4=additional recon required; 5=no recon; 6=non-viable

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-001	SA_0-350	-117.91973161	33.716066364		6	Only several inches of water outside of the low flow channel
CAS04476-003	SA_0-350	-117.73206159	33.658501846		6	Site unreachable due to Amtrak station.
CAS04476-004	SA_0-350	-117.81463072	33.595863286		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-005	SA_0-350	-117.48160940	33.829122041		6	Stagnent pond
CAS04476-006	SA_0-350	-117.89104922	33.643373767		6	Brackish (Newport Beach backbay)
CAS04476-011	SA_0-350	-117.78352517	33.850751000	Y	1	bridge at imperial highway over santa ana river, gated access road on northeast side (Atl GPS
CAS04476-012	SA_0-350	-117.81995033	33.919145069	Y	1	Sampled 31 May 06
CAS04476-013	SA_0-350	-117.76353735	33.722372773		6	Not Located; Housing tract (31 May 06)
CAS04476-015	SA_0-350	-117.68321695	33.892216066	Y	3	Chino Hill State Park (?) Brush Canyon Trail (31 May 06)
CAS04476-019	SA_0-350	-117.61286303	33.911511385	Y	1	Alt ~ -117.59751, 33.92388; Sampled 15June06
CAS04476-023	SA_0-350	-118.08366318	33.732846479		6	Salt marsh in wildlife refuge. Brackish.
CAS04476-026	SA_0-350	-117.83457265	33.581391317		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-029	SA_0-350	-117.86533228	33.863403618		6	Not located; Housing tract
CAS04476-037	SA_0-350	-117.70886109	33.661376915		6	Not located; Housing tract
CAS04476-040	SA_0-350	-117.69309905	33.804471368		5	
CAS04476-042	SA_0-350	-117.61435352	33.945867213	Y	1	Sampled 31 May 06 by bioassessment group (not CRAM)
CAS04476-046	SA_0-350	-117.71671396	33.792624077	Y	3	Irvine co Land (949-936-8026);
CAS04476-048	SA_0-350	-117.78566472	33.717517871		6	No water F05
CAS04476-052	SA_0-350	-117.68683278	33.693517789		3	Irvine Co land (949-936-8026); Portolo Gate/Irvine Ranch; Operated by Nature Conserv (714-8
CAS04476-056	SA_0-350	-117.85449077	33.581784741		6	No water F05
CAS04476-059	SA_0-350	-117.82185260	33.824615913		6	No apparent water from topo and aerial maps. Meats Ave. and Santiago Blvd. In Villa Park.
CAS04476-060	SA_0-350	-118.03419287	33.696367975		6	Inaccessable land on Bolsa Chica ecological reserve. Brackish.
CAS04476-066	SA_0-350	-117.44886942	33.757389645		6	Inaccessable canyon
CAS04476-071	SA_0-350	-117.67537558	33.748189466	Y	3	great site on Irvine Co land!! See report classproject_F04
CAS04476-077	SA_0-350	-117.88772079	33.769684568		6	Dry, Rock Bottom See report classproject_F04 & S06
CAS04476-081	SA_0-350	-117.58158781	34.077769884		6	Building Located on site
CAS04476-082	SA_0-350	-117.87218400	33.648799828		6	Brackish (Newport Beach backbay)
CAS04476-089	SA_0-350	-117.83017893	33.589391161		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-090	SA_0-350	-117.94998917	33.650818106		6	Brackish
CAS04476-091	SA_0-350	-117.81007019	33.832653530		6	[topo/aerial maps] This is now a housing tract. Could be a bad point for a non-perrenial strear
CAS04476-098	SA_0-350	-117.28450266	34.082653942		4	concrete flood control channel
CAS04476-099	SA_0-350	-117.90226228	33.756562881		6	Brackish, influenced by the tide; F04
CAS04476-101	SA_0-350	-117.95406589	33.636798691		6	Brackish, influenced by the tide; F04

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-102	SA_0-350	-117.69544191	33.874679190		2	*Access (Y); Water (Y); Width (15); Cell Service (Y). Fast Current, may be too deep; May have
CAS04476-104	SA_0-350	-117.75117711	33.849231548		6	*Access (?); Water (N); Width (?); Cell Service (Y). Gated access; Calvery Chapel, Yorba Lind
CAS04476-108	SA_0-350	-117.64380698	33.888615756		3	Prado Dam Administration; 91→Serfas Club; no recon F05
CAS04476-109	SA_0-350	-117.58358733	34.050816328		3	Private Property. Hoffer Ranch = Contact Paul Hoffer (909) 390 - 2555. See report Team_Cu
CAS04476-110	SA_0-350	-117.46338591	33.963529961		1	*Between SA river and a tributary. See reort BigBear_RiversideReconn. August 2005; Sampl
CAS04476-113	SA_0-350	-117.88971499	33.722334612		6	Not Located; Housing tract
CAS04476-119	SA_0-350	-117.71971434	33.733844832		6	*No water July 2005
CAS04476-120	SA_0-350	-117.88493905	33.673218359		5	
CAS04476-122	SA_0-350	-117.48805729	33.961597963		6	*Access via Santa Ana River Regional Park. May be able to drive dirt trail. Not long enough to
CAS04476-129	SA_0-350	-117.64333273	33.933805235		6	Site located in reservoir 14June06
CAS04476-134	SA_0-350	-117.39095087	34.005782174		6	Dry 14June06, Rock Bottom See report classproject_F04 & S06
CAS04476-136	SA_0-350	-117.67979485	33.699873843		5	
CAS04476-137	SA_0-350	-117.75747157	33.861774128		3	*Access (?); Water (N); Width (?); Cell Service (Y). Gated access; Calvery Chapel, Yorba Lind
CAS04476-139	SA_0-350	-117.33374300	34.045723989		4	wash, mostly sediment, probably some flow all year, 1/4 mile upstream might be bette
CAS04476-140	SA_0-350	-117.74360520	33.894696260		6	*Access (Y); Water (N); Width (?); Cell Service (Y). Access gated with no sign across from co
CAS04476-141	SA_0-350	-117.66298453	33.756682640		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-142	SA_0-350	-117.68857594	33.773857788		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-143	SA_0-350	-117.76911315	33.756478213		6	amongst gated communities. See report classproject_F04
CAS04476-145	SA_0-350	-117.32405667	34.041007296		6	subterranean aqueduct
CAS04476-149	SA_0-350	-117.67941087	33.767738442		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-150	SA_0-350	-117.68768184	33.911667683		3	Access road gate off of Hwy 71 (N) 33.88697Lat, 117.64509 Long. See report classproject_F0
CAS04476-151	SA_0-350	-117.40591186	33.991010501		6	*Bad coordinate. No water in area. SA river approx. 1 km WSW. See BigBear_RiversideRec
CAS04476-152	SA_0-350	-117.85014861	33.651559437		6	*Black sediment, unsafe (sticky waist high mud), across from UCI. July 2005
CAS04476-153	SA_0-350	-117.49802800	33.815839983		4	Stream next to Golf course. Golf course under construction.
CAS04476-154	SA_0-350	-117.76915753	33.787754525		6	Within suburban community/no visable hydrology
CAS04476-157	SA_0-350	-117.60934438	34.093279054		4	
CAS04476-165	SA_0-350	-117.47750360	33.963651513		5	
CAS04476-166	SA_0-350	-117.76221329	33.794260848		6	near Irvine regional Park/no visable hydrology. Underground Aqueduct See report classproje
CAS04476-169	SA_0-350	-117.57735575	33.936595897		4	This site is just before the holding area behind Prado Dam. Might be a lake in 2005.
CAS04476-170	SA_0-350	-117.74495582	33.888062925		6	*Access (Y); Water (N); Width (?); Cell Service (Y). Access gated with no sign across from co
CAS04476-171	SA_0-350	-117.77767756	33.728097524		6	No water F05
CAS04476-175	SA_0-350	-117.88022640	33.859537481		5	
CAS04476-177	SA_0-350	-117.69956025	33.797930535		5	
CAS04476-178	SA_0-350	-117.81361991	33.682068359		4	Located by a shopping center. See report AdamNickJesse.
CAS04476-179	SA_0-350	-117.46746722	33.769647952		3	See report AdamNickJesse.
CAS04476-180	SA_0-350	-117.78710609	33.671751921		2	Alton/Jeffery near overpass. Sampled in pilot SU05; Use coordinates 33.67175; -117.78711

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-182	SA_0-350	-117.59578995	33.926634348		4	This site is just before the holding area behind Prado Dam. Might be a lake in 2005.
CAS04476-186	SA_0-350	-117.61632078	33.917341844		6	not located, roads to site not accessible due to gating on Cucamonga (arthur farms),
CAS04476-190	SA_0-350	-117.32649054	34.034802592		6	subterranean aqueduct
CAS04476-191	SA_0-350	-117.47871867	33.965379989		2	*****Access via Santa Ana River Regional Park. May be able to drive dirt trail. See report BigBea
CAS04476-195	SA_0-350	-117.28441671	34.078293635		4	concrete flood control channel
CAS04476-197	SA_0-350	-117.70095709	33.983477179		5	
CAS04476-198	SA_0-350	-117.62180793	33.938081245		4	Site not located due to gate/fence/no tresspassing. Ownership: Arther Farms. See report clas
CAS04476-200	SA_0-350	-117.72097562	33.656823520		4	NO access
CAS04476-201	SA_0-350	-117.54069621	34.076373138		4	
CAS04476-204	SA_0-350	-117.59954245	33.977408524		4	Concrete flood control channel. See report Team_Cucamanga.
CAS04476-210	SA_0-350	-117.73631587	33.795416012		6	*****Behind Irvine Park. Irvine Co. land (conservancy regulated?). Dries up in April.
CAS04476-213	SA_0-350	-117.34057760	34.047880757		4	wash, mostly sediment, probably some flow all year, 1/4 mile upstream might be bette
CAS04476-215	SA_0-350	-117.73816248	33.874171612		2	*Access (Y); Water (Y); Width (15); Cell Service (Y). Tributary off Santa Ana 8-21-05; Sample
CAS04476-220	SA_0-350	-117.31576823	34.083180102		4	concrete flood control channel
CAS04476-223	SA_0-350	-117.68605253	33.894326526		3	Access road gate off of Hwy 71 (N) 33.88697Lat, 117.64509 Long. See report classproject_F0
CAS04476-229	SA_0-350	-117.50813479	33.832841524		4	Might not have water during normal years (precipitation). See report AdamNickJesse
CAS04476-231	SA_0-350	-117.69053862	33.967795952		4	subterranean flood control surrounded by chain link fence. See report calssproject_F04
CAS04476-234	SA_0-350	-117.82329809	33.677616873		5	
CAS04476-237	SA_0-350	-118.08201143	33.740466216		6	Salt marsh in wildlife refuge; Military Base. Brackish
CAS04476-256	SA_0-350	-117.72485378	33.790272475		6	*****Behind Irvine Park. Irvine Co. land (conservancy regulated?). Dries up in April.
CAS04476-260	SA_0-350	-117.89287892	33.727815728		5	
CAS04476-261	SA_0-350	-117.82108046	33.596594251		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-262	SA_0-350	-117.57578700	33.893624523		3	WRCRWA south regional pumping station, part of riverside county flood control. See report cl
CAS04476-265	SA_0-350	-117.27964362	34.070901046		2	Good access, robust riparian habitat, good flow. Adjacent to golf course and gravel quarry. Se
CAS04476-273	SA_0-350	-117.32600724	34.036594730		6	subterranean aqueduct
CAS04476-275	SA_0-350	-117.88785031	33.857557606		5	
CAS04476-278	SA_0-350	-117.84623996	33.603725635		4	Recheck. See report classproject_F04
CAS04476-285	SA_0-350	-117.27405879	34.064063636		4	concrete flood control channel
CAS04476-287	SA_0-350	-117.71157408	33.735152513		6	*****No Water July 2005
CAS04476-293	SA_0-350	-117.48842997	33.787031444		4	Dawson Canyon and Park Canyon (See report AdamNickJesse). Suspect this was just spring
CAS04476-294	SA_0-350	-117.48984093	33.967151118		2	*****Access via Santa Ana River Regional Park. May be able to drive dirt trail. See report BigBea
CAS04476-299	SA_0-350	-117.88258122	33.689495500		6	Business Area S06
CAS04476-303	SA_0-350	-117.83828734	33.660737450		6	*****Black sediment, unsafe (sticky waist high mud), across from UCI
CAS04476-305	SA_0-350	-117.79974844	33.708199946		3	Orange County Environmental Management Agency; viable with permission; F05
CAS04476-306	SA_0-350	-117.88464946	33.699054308		2	Alt GPS~ 33.70877, -117.80032; Original site of softball field; Harvard Ave in Irvine; S06
CAS04476-308	SA_0-350	-117.83940867	33.575903358		4	Must walk upstream in extreme brush. See report classproject_F04.

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-310	SA_0-350	-117.74741680	33.875973219		2	*Coordinate is a little off but the river looks good S. of here. Some bush-whacking (Mark 2005
CAS04476-312	SA_0-350	-117.53012683	33.957181418		5	
CAS04476-315	SA_0-350	-117.67325425	33.762096425		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-323	SA_0-350	-117.76134168	33.734586330		5	
CAS04476-324	SA_0-350	-117.91701879	33.849977153		5	
CAS04476-325	SA_0-350	-117.89427297	33.766026211		3	Riverview Golf Course; viable S06
CAS04476-330	SA_0-350	-117.88960383	33.637155830		6	Brackish (Newport Beach backbay)
CAS04476-337	SA_0-350	-117.62482575	33.909960226		6	Underwater (Behind Prado Dam). See report classproject_F04. *****Decision based on maps and
CAS04476-338	SA_0-350	-117.74654663	33.880248467		4	*Bad coordinate? Report classproject_F04 states this is behind Costco but its not. This is up
CAS04476-339	SA_0-350	-117.46598413	33.765073897		3	See report AdamNickJesse.
CAS04476-340	SA_0-350	-117.74148273	33.857707522		5	
CAS04476-341	SA_0-350	-117.87810889	33.786198962		4	[topo/aerial maps] Freeway offramp (Chapman). Closest water is SA river (.03 km away). Ba
CAS04476-343	SA_0-350	-117.52220496	33.811892896		6	Row crops F05
CAS04476-351	SA_0-350	-117.52140586	33.966810557		5	
CAS04476-354	SA_0-350	-117.51380526	33.820072958		6	[topo/aerial map + physical recon]. This is an orchard. Dry
CAS04476-356	SA_0-350	-117.58815341	33.931300968		4	This site is just before the holding area behind Prado Dam. Might be a lake in 2005.
CAS04476-361	SA_0-350	-117.43757297	33.968736707		2	Sampled in pilot Su05; Use coordinates 33.96953; -117.43792
CAS04476-364	SA_0-350	-117.70982424	33.681977114		5	
CAS04476-368	SA_0-350	-117.79425890	33.639733101		5	
CAS04476-369	SA_0-350	-117.72027741	33.669316264		5	
CAS04476-386	SA_0-350	-117.90558379	33.752371619		6	Brackish; influenced by the tide; S06
CAS04476-391	SA_0-350	-117.31189517	34.054982647		5	
CAS04476-393	SA_0-350	-117.61456661	33.918673334		3	Probably under water this year (2005). Behind Prado Dam. See report classproject_F04.
CAS04476-395	SA_0-350	-117.60104677	33.968613788		4	Concrete flood control channel. See report Team_Cucamanga
CAS04476-400	SA_0-350	-117.50924706	33.830115577		4	Might not have water during normal years (precipitation). See report AdamNickJesse
CAS04476-403	SA_0-350	-117.67799278	33.962903575		5	
CAS04476-404	SA_0-350	-117.54088102	34.060943353		4	Concrete flood control channel. See report Team_Cucamanga.
CAS04476-406	SA_0-350	-117.38873659	33.917334059		5	
CAS04476-411	SA_0-350	-117.62098446	33.933880403		5	
CAS04476-412	SA_0-350	-117.70560631	33.733404794		6	*****No water July 2005
CAS04476-418	SA_0-350	-117.80599195	33.680522971		4	Just East of site 673.
CAS04476-420	SA_0-350	-117.63123117	33.908036454		6	Underwater (Behind Prado Dam). See report classproject_F04. *****Decision based on maps and
CAS04476-422	SA_0-350	-117.72560720	33.873577897		2	Park on Old Village Road, run across street, down the slope (slight) to access road. See repor
CAS04476-429	SA_0-350	-117.81723708	33.798690097		5	
CAS04476-432	SA_0-350	-117.74092124	33.720135412		6	*****No water July 2005
CAS04476-437	SA_0-350	-117.76979440	33.725741948		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-439	SA_0-350	-117.53365954	33.868743823		3	See report AdamNickJesse.
CAS04476-441	SA_0-350	-117.90065035	33.854232162		5	
CAS04476-442	SA_0-350	-117.80695928	33.922106090		4	Need to access via Soquel Canyon Road, probably opposite Olinda Dr. off of Hwy 142. See re
CAS04476-450	SA_0-350	-117.51075774	33.970879634		3	*****Hidden Valley Wildlife Preserve. Fast moving water, may be too deep. See report BigBear_F
CAS04476-462	SA_0-350	-117.75376040	33.650965514		4	Construciton underway close to site.
CAS04476-465	SA_0-350	-117.78991487	33.810564940		5	
CAS04476-467	SA_0-350	-117.47784618	33.782698852		4	Not able to reach site. To many ubstructions. See report AdamNickJesse
CAS04476-468	SA_0-350	-117.37588416	34.020700240		5	
CAS04476-473	SA_0-350	-117.76821520	33.786718568		5	
CAS04476-475	SA_0-350	-117.42451980	33.972627118		2	*****SA river wildlife area. County/State vehicle access wide enough for van. See BigBear_Rivers
CAS04476-480	SA_0-350	-118.08258852	33.804151050		4	Coyote Creek. See report classproject_F04
CAS04476-481	SA_0-350	-117.42036647	33.976731371		3	*****Channelized Creek. Gated by Riverside County Flood Control and H20 Conservation District.
CAS04476-486	SA_0-350	-117.88493860	33.647800846		6	Brackish (Newport Beach backbay)
CAS04476-487	SA_0-350	-117.73250803	33.794747497		6	*****Behind Irvine Park. Irvine Co. land (conservancy regulated?). Dries up in April.
CAS04476-491	SA_0-350	-117.66077546	33.762325952		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-493	SA_0-350	-117.88993452	33.636147588		6	Brackish (Newport Beach backbay)
CAS04476-494	SA_0-350	-117.47379458	33.962925137		3	*****Hidden Valley Wildlife Preserve. Probably water but thick vegetation. See report BigBear_Riv
CAS04476-495	SA_0-350	-117.93400580	33.694431145		6	Only several inches of water outside of the low flow channel. *****Dry August 2005 (Mark). See re
CAS04476-497	SA_0-350	-117.74372952	33.652986419		5	
CAS04476-498	SA_0-350	-117.76593899	33.659822965		4	Laguna Canyon road.
CAS04476-503	SA_0-350	-117.83017879	33.605236262		3	Irvine Co Land; no recon F05
CAS04476-504	SA_0-350	-117.75956222	33.655065133		4	Near commercial buildings.
CAS04476-505	SA_0-350	-117.78427176	33.804365429		5	
CAS04476-507	SA_0-350	-117.63776093	33.917348120		6	Behaind Prado Dam. This site is under a lake as of August 2005. See report AdamNickJesse
CAS04476-509	SA_0-350	-117.88232534	33.693988431		6	Business Complex S06
CAS04476-511	SA_0-350	-117.65600479	33.735346083		3	looks like it could be a good site on Irvine Co land. See report classproject_F04
CAS04476-521	SA_0-350	-117.69632373	33.981691166		5	
CAS04476-525	SA_0-350	-117.83005372	33.586573440		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-528	SA_0-350	-117.71311322	33.874751021		2	*****Pretty good access. Short hike through brush to river. Site not completely reconned. & river t
CAS04476-529	SA_0-350	-117.72744856	33.787287452		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-532	SA_0-350	-117.83168645	33.782829242		2	Sampled in pilot Su05; Use coordinates 33.78291; -11783181
CAS04476-541	SA_0-350	-117.87440713	33.788728920		4	[topo/aerial maps] Housing tract. Closest water is SA river (0.6 km away). Bad SA river point
CAS04476-542	SA_0-350	-117.86623701	33.591479092		6	Extreme brush, no trails and toxic water contaminents. See report classproject_F04.
CAS04476-546	SA_0-350	-117.36571638	34.030739390		5	
CAS04476-547	SA_0-350	-117.95260567	33.641561149		6	Only several inches of water outside of the low flow channel. See report classproject_F04; No
CAS04476-548	SA_0-350	-117.51505591	34.089789138		4	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-549	SA_0-350	-117.88128953	33.659148017		4	Extreme brush, no trails and toxic water contaminents. Must take beach access and w
CAS04476-551	SA_0-350	-117.73152244	33.880385782		2	park at 22711 La Palma, run across street, down slope to river. *Coordinate is a little off but pr
CAS04476-557	SA_0-350	-117.73776401	33.673908362		5	
CAS04476-558	SA_0-350	-117.53841869	33.871385516		4	
CAS04476-561	SA_0-350	-117.64381218	33.917810695		5	
CAS04476-564	SA_0-350	-117.65989281	33.744992957		2	perfect site; 241→Blackstar/Silverado Canyon F05
CAS04476-566	SA_0-350	-117.59857946	33.998699597		4	Concrete flood control channel. See report Team_Cucamanga.
CAS04476-570	SA_0-350	-117.66499660	33.883281627		4	Chino Hills State Park; no recon F05
CAS04476-572	SA_0-350	-117.29098229	34.067553305		2	Good access, robust riparian habitat, good flow. Adjacent to golf course and gravel quarry. Se
CAS04476-574	SA_0-350	-117.58788746	33.898427489		3	City property of Norco/Corona, near corner of Rincon and Corydon. See report classproject_F0
CAS04476-584	SA_0-350	-117.55453788	33.881722731		3	concrete flood control channel (see report AdamNickJesse); viable
CAS04476-585	SA_0-350	-117.73066223	33.720150942		6	*****No water July 2005
CAS04476-589	SA_0-350	-117.83691391	33.814337243		6	Housing tract. No water within 1 km of site; S06
CAS04476-591	SA_0-350	-117.94375297	33.675447911		4	Only several inches of water outside of the low flow channel. See report classproject_F04
CAS04476-592	SA_0-350	-118.06939870	33.741132647		6	Salt marsh in wildlife refuge; Military Base. Brackish
CAS04476-593	SA_0-350	-117.87577044	33.698357889		5	
CAS04476-594	SA_0-350	-117.55380116	33.946127852		3	*****May be able to acess via River Trails Stables on Hammer Rd. (909?) 736-9800. See report E
CAS04476-595	SA_0-350	-117.65285168	33.883820975		4	Chino Hills State Park; no recon F05
CAS04476-599	SA_0-350	-117.85509235	33.600084156		4	Recheck. See report classproject_F04
CAS04476-601	SA_0-350	-117.58647797	34.026308397		4	
CAS04476-602	SA_0-350	-117.72641659	33.654061133		6	Concrete lined channel; no water F05
CAS04476-604	SA_0-350	-117.46842760	33.774504872		3	See report AdamNickJesse.
CAS04476-606	SA_0-350	-117.67778057	33.763873110		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-608	SA_0-350	-117.64299815	33.902662802		3	Prado Dam Administration; 91→Serfas Club; no recon F05
CAS04476-610	SA_0-350	-117.67897014	33.759921231		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-614	SA_0-350	-117.67183427	33.955283433		5	
CAS04476-616	SA_0-350	-117.45083757	33.758179353		4	Not able to reach site. To many ubstructions
CAS04476-633	SA_0-350	-118.01959647	33.871814837		4	Coyote Creek. See report classproject_F04
CAS04476-636	SA_0-350	-117.83222051	33.584439849		6	Dense Vegetation on Steep Slopes, Not Accessible. See report classproject_F04.
CAS04476-637	SA_0-350	-117.32712544	34.100152983		4	concrete flood control channel
CAS04476-639	SA_0-350	-117.59854344	33.992782607		4	
CAS04476-640	SA_0-350	-117.62972998	33.895802851		3	Prado Dam Administration; 91→Serfas Club; no recon F05
CAS04476-645	SA_0-350	-117.54087506	34.048317510		4	Concrete flood control channel. See report Team_Cucamanga.
CAS04476-647	SA_0-350	-117.40207568	33.901846317		5	
CAS04476-652	SA_0-350	-117.68652561	33.876349208		5	
CAS04476-658	SA_0-350	-117.86004100	33.650894069		6	*****Black sediment, unsafe (sticky waist high mud), across from UCI. July 2005

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-659	SA_0-350	-117.84741769	33.596430245		4	Recheck. See report classproject_F04
CAS04476-661	SA_0-350	-117.75521008	33.859034077		3	Locked gate; no info; no recon S06
CAS04476-665	SA_0-350	-117.64451439	33.898512987		3	Prado Dam Administration; 91→Serfas Club; no recon F05
CAS04476-666	SA_0-350	-117.85662568	33.594374275		4	Recheck this site. See report classproject_F04.
CAS04476-669	SA_0-350	-117.49698478	33.802299111		6	See report AdamNickJesse.
CAS04476-671	SA_0-350	-117.94816971	33.655928843		4	See report classproject_F04
CAS04476-673	SA_0-350	-117.80794738	33.681389018		4	Near Irvine adult school.
CAS04476-685	SA_0-350	-117.77470400	33.744603353		5	
CAS04476-689	SA_0-350	-117.75764305	33.788923395		6	*Underground.
CAS04476-691	SA_0-350	-117.62562746	33.923611732		4	Site not located due to gate/fence/no tresspassing. Ownership: Arther Farms. Se report class
CAS04476-697	SA_0-350	-117.88992805	33.715234383		5	
CAS04476-703	SA_0-350	-117.86736973	33.771271262		4	Santiago Creek. See report classproject_F04
CAS04476-705	SA_0-350	-117.51115113	33.850069325		3	Government property. See report AdamNickJesse
CAS04476-709	SA_0-350	-117.70466107	33.872583993		2	Same river area as site 102, water may be too deep; F05
CAS04476-710	SA_0-350	-117.84099252	33.603147385		3	Irvine Co Land; no recon F05
CAS04476-720	SA_0-350	-117.59849723	34.004067196		4	
CAS04476-725	SA_0-350	-117.85727771	33.800432223		4	[topo/aerial maps] Parking lot. Concrete flood channel 1 km to the west. SA river an additiona
CAS04476-728	SA_0-350	-117.75778848	33.786099534		6	*No water July 2005
CAS04476-732	SA_0-350	-117.46948963	33.833437409		4	Not able to reach site. To many ubstructions. See report AdamNickJesse.
CAS04476-737	SA_0-350	-117.61549915	33.906664513		3	Probably underwater this year (2005). See report classproject_F04.
CAS04476-742	SA_0-350	-117.32397231	34.094804910		4	concrete flood control channel
CAS04476-745	SA_0-350	-117.75135177	33.729458727		5	
CAS04476-747	SA_0-350	-117.60693125	33.919246515		3	Behind Prado Dam. See report classproject_F04. Probably underwater (2005).
CAS04476-749	SA_0-350	-117.69235004	33.774087832		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-010	SA_350-700	-117.04509588	33.941509111		3	Couldn't access (private land). Might have water. See report canfield-pernot or talk to Mark C
CAS04476-016	SA_350-700	-117.66418156	33.771129113		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-017	SA_350-700	-117.36382035	34.161176725	Y	6	*No water July 2005
CAS04476-018	SA_350-700	-117.38417535	34.190599586		6	*Wash with water <1 m wide and water <2 cm deep July 2005
CAS04476-028	SA_350-700	-117.44504460	34.203004484	Y	1	Lytle creek - gun range watch out for nuts 04June06
CAS04476-032	SA_350-700	-117.08738209	34.077298499	Y	1	Sampled at alt gps 03June06
CAS04476-043	SA_350-700	-117.39273724	34.204730956		6	*Wash with water <1 m wide and water <2 cm deep. July 2005
CAS04476-047	SA_350-700	-117.35638893	33.832293967		6	No water S06
CAS04476-051	SA_350-700	-117.15384395	33.995912140	Y	1	Sampled 03June06
CAS04476-055	SA_350-700	-117.22004775	34.039247797	Y	1	Sampled 03June06
CAS04476-063	SA_350-700	-117.65816549	33.791497405		6	Inaccessable canyon 02June06
CAS04476-072	SA_350-700	-117.48975123	34.155551284		3	Need access form San Bern County Flood control district; Recharge basin 04June06

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-076	SA_350-700	-117.17499265	34.087894709		2	Sampled in pilot Su05; Use coordinates 34.08684; -117.17420
CAS04476-079	SA_350-700	-117.40595247	34.219556993	Y	1	Sampled 04 June 06; Alt GPS
CAS04476-085	SA_350-700	-117.23309791	34.049964960	Y	1	Sampled 04 June 06
CAS04476-086	SA_350-700	-117.61211764	34.109363630		4	
CAS04476-092	SA_350-700	-117.06248263	33.954342058		3	No apparent water from our upstream location. This wash intersects a stream in the area of thi
CAS04476-094	SA_350-700	-117.38508074	34.163531461		2	15→Sierra Ave (Right)→Riverside Ave. (Left)→Cedar (Right); May not be the best way to get
CAS04476-114	SA_350-700	-117.18422203	34.153799757		2	Stream runs through ravine along a dirt bank with trees and brush. Tough access. See report
CAS04476-115	SA_350-700	-117.28632829	33.833090576		6	No water S06
CAS04476-117	SA_350-700	-117.16750191	34.086085425		2	From site 076 hike ~1/2 mile upstream to site 117. See report MasonGroup.
CAS04476-121	SA_350-700	-117.19110260	34.123678563		3	No Parking on Boulder, easier access from Baseline road. No trespassing, San Bernadino Flo
CAS04476-132	SA_350-700	-117.06110899	33.951177569		3	No apparent water from our upstream location. This wash intersects a stream in the area of thi
CAS04476-133	SA_350-700	-117.35550343	34.169772278		6	*****No water July 2005
CAS04476-138	SA_350-700	-117.55760532	34.160062607		2	210→Haven Ave (Right)→Paddock (Right)→Ranch (Right); gated community, may need perm
CAS04476-144	SA_350-700	-117.13546159	34.130445747		6	Could no access site. Housing development in the way. See report MasonGroup and Satphoto
CAS04476-146	SA_350-700	-117.05127352	33.944266716		3	Might have water. See report canfield-pernot.
CAS04476-162	SA_350-700	-117.41241589	33.730483552		4	See report AdamNickJesse.
CAS04476-164	SA_350-700	-117.37959239	34.165012765		6	Inaccessable 02June06
CAS04476-167	SA_350-700	-117.18078851	34.163342944		2	*Very steep cliff. With backpacks and a long hike, might be able to access from site 274. 7-23-
CAS04476-176	SA_350-700	-117.03741213	33.940253482		6	Access from site 045, very long hike. Looks to be a dry wash, not viable site. Dry. See report c
CAS04476-193	SA_350-700	-117.65418548	33.797585194		6	Inaccessable canyon 02June06
CAS04476-194	SA_350-700	-117.55522309	33.785793306		6	Inaccessable canyon
CAS04476-199	SA_350-700	-117.48848055	34.153248524		3	Gated area; no info; no recon F05
CAS04476-207	SA_350-700	-117.09273715	33.974684320		5	
CAS04476-208	SA_350-700	-117.16340011	34.001034402		5	
CAS04476-209	SA_350-700	-117.34232662	34.130677099		6	No water F05
CAS04476-216	SA_350-700	-117.68537906	33.822589539		5	
CAS04476-222	SA_350-700	-117.24803045	34.195857096		3	*Campus Crusade property. 7-23-05
CAS04476-226	SA_350-700	-117.26331337	34.181432061		3	*Campus Crusade property. 7-23-05
CAS04476-227	SA_350-700	-117.69968614	33.813745717		5	
CAS04476-230	SA_350-700	-117.12723060	34.102805615		6	This is not a stream site. The only water nearby is a reservoir. See report MasonGroup.
CAS04476-236	SA_350-700	-117.42842144	33.745137792		6	No water S06
CAS04476-238	SA_350-700	-117.12926364	34.003375887		6	See report canfield-pernot.
CAS04476-244	SA_350-700	-117.55217738	33.790996764		5	
CAS04476-246	SA_350-700	-117.40713804	34.170676249		5	
CAS04476-249	SA_350-700	-117.37496831	34.157171946		3	El Rancho Verde Golf Course (909-875-5346); no recon F05
CAS04476-253	SA_350-700	-117.65348093	33.801898026		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-255	SA_350-700	-117.08851727	34.020235199		6	poor sample site. See report canfield-pernot.
CAS04476-258	SA_350-700	-117.17831086	34.014294990		5	
CAS04476-259	SA_350-700	-117.09261683	34.077116721		4	See report MasonGroup.
CAS04476-274	SA_350-700	-117.18292428	34.173193227		2	*Steep trail to creek. We can do this with backpacks 7-23-05
CAS04476-277	SA_350-700	-117.25451658	34.190055065		3	*Campus Crusade property. 7-23-05
CAS04476-283	SA_350-700	-117.33724910	34.125922204		6	No water F05
CAS04476-292	SA_350-700	-117.69772238	33.809533920		5	
CAS04476-295	SA_350-700	-117.67711765	33.827399704		5	
CAS04476-298	SA_350-700	-117.37891493	34.160336939		3	El Rancho Verde Golf Course (909-875-5346); no recon F05
CAS04476-300	SA_350-700	-117.56526064	34.163575385		4	
CAS04476-316	SA_350-700	-117.38433372	34.184089575		6	No site F05
CAS04476-318	SA_350-700	-117.50667446	34.118490457		6	No water. No wash present, W. Liberty and S. Heritage
CAS04476-319	SA_350-700	-117.15514477	34.086090378		6	No water. See report MasonGroup.
CAS04476-321	SA_350-700	-117.43183022	34.190542662		3	Drive up Lytle Creek Rd, right turn at Glen Helen Pkwy. See report Guarino. Glen Helen Regio
CAS04476-326	SA_350-700	-117.23785771	34.155372386		5	
CAS04476-327	SA_350-700	-117.42639228	34.233250273		5	
CAS04476-328	SA_350-700	-117.36373232	34.145587796		6	No water; Housing tract F05
CAS04476-332	SA_350-700	-117.31706557	33.836728215		5	
CAS04476-350	SA_350-700	-117.53679848	33.800950225		6	Eagle Glen Golf Course S06
CAS04476-352	SA_350-700	-117.20087791	34.107790157		4	Original GPS#'s were right but the stream is diverted (400ft W.) due to constuction. See report
CAS04476-353	SA_350-700	-117.50306425	34.126209631		6	Concrete lined channel; no water F05
CAS04476-355	SA_350-700	-117.36601832	34.147882865		6	No water; Housing tract F05
CAS04476-366	SA_350-700	-117.14899168	33.991655513		5	
CAS04476-374	SA_350-700	-117.29087090	33.824011978		5	
CAS04476-387	SA_350-700	-117.16493828	34.004547466		5	
CAS04476-396	SA_350-700	-117.43232478	34.236030809		5	
CAS04476-398	SA_350-700	-117.18865121	34.136438227		3	This site is located near the East Valley Water District. I think this is psycho-dog site. See repo
CAS04476-414	SA_350-700	-117.37669335	34.168123917		3	El Rancho Verde Golf Course (909-875-5346); no recon F05
CAS04476-421	SA_350-700	-117.20655735	34.102835490		3	Conservation Area (Santa Ana Woolly Star - 25.000$ fine). Need permission. See report Maso
CAS04476-430	SA_350-700	-117.10783615	34.049390634		6	paved over; crafton community college. See report canfield-pernot.
CAS04476-443	SA_350-700	-117.54977539	34.146993005		6	Dry wash; F05
CAS04476-444	SA_350-700	-117.64877893	33.783323987		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-466	SA_350-700	-117.08511734	33.961256600		5	
CAS04476-469	SA_350-700	-117.14588031	34.110798614		4	Access site from Greenspot Road, go L on Alta Vista, R on Santa Ana Canyon (in subur
CAS04476-479	SA_350-700	-117.07923472	34.030951950		6	poor sample site. See report canfield-pernot.
CAS04476-502	SA_350-700	-117.56472171	34.133026675		4	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-506	SA_350-700	-117.45375874	33.854327438		5	
CAS04476-510	SA_350-700	-117.54492846	33.797251401		5	
CAS04476-518	SA_350-700	-117.21851915	34.091794585		3	Access at Nevada St. near wastwater treatment plant (City of Redlands). Need permission. S
CAS04476-524	SA_350-700	-117.13771021	34.123823473		6	Could not access site. Housing development in the way. No alternate access route. See repor
CAS04476-534	SA_350-700	-117.63397345	34.147672809		6	San Bernadino Flood Control District; Concrete lined channel; no water F05
CAS04476-536	SA_350-700	-117.10725988	34.042243239		6	not a stream, run off area, no water unless it has recently rained. See report canfield-pernot.
CAS04476-544	SA_350-700	-117.66364359	33.718621090		5	
CAS04476-545	SA_350-700	-117.26844960	34.140237498		5	
CAS04476-550	SA_350-700	-117.65460565	33.774562301		3	Irvine Co land behind access gate/need ranger escort. See report classproject_F04
CAS04476-552	SA_350-700	-117.23944120	34.152586085		5	
CAS04476-553	SA_350-700	-117.55808226	34.149374026		6	San Bernadino Flood Control District; Concrete lined channel; no water F05
CAS04476-559	SA_350-700	-117.21351833	34.035356169		5	
CAS04476-562	SA_350-700	-117.12988794	34.136190023			Could no access site. Housing development in the way. No alternate access. See report Masc
CAS04476-567	SA_350-700	-117.08222065	33.971553605		5	
CAS04476-573	SA_350-700	-117.29729042	33.811178196		5	
CAS04476-582	SA_350-700	-117.21053173	34.099917493		3	Road closed ~ 0.13 miles from site. Conservation area (Santa ana river Wolly Star). Need per
CAS04476-583	SA_350-700	-117.19314769	34.118366783		2	Sampled in pilot Su05; Use coordinates 34.11911; -117.19322
CAS04476-598	SA_350-700	-117.54007964	34.119657054		3	San Bernadino Flood Control District; Concrete lined channel;with water F05; Day Creek & Bas
CAS04476-611	SA_350-700	-117.35483538	33.822342049		5	
CAS04476-613	SA_350-700	-117.12769790	33.984915367		5	
CAS04476-615	SA_350-700	-117.38575224	34.160062268		4	Wash area, probably won't have water past June. Arid area with no riparian habitiat
CAS04476-622	SA_350-700	-117.35659061	33.809559964		5	
CAS04476-626	SA_350-700	-117.34208487	33.833459218		5	
CAS04476-628	SA_350-700	-117.62869413	34.137444264		4	
CAS04476-629	SA_350-700	-117.06491335	33.958399767		6	Marshy, choked with reeds, couldn't see any open running water. See report canfield-pernot
CAS04476-634	SA_350-700	-117.69874191	33.821596613		5	
CAS04476-638	SA_350-700	-117.11173145	34.102874650		3	Not much traffic. Site is just off Greenpot Rd. at the intersection of Santa Ana Ca…See report
CAS04476-646	SA_350-700	-117.11675236	34.006951323		6	poor site for riparian sampling. See report canfield-pernot.
CAS04476-651	SA_350-700	-117.11069212	34.085306149		4	See report MasonGroup.
CAS04476-656	SA_350-700	-117.14230185	34.105188076		3	East Valley Water District employee said no streams were present behind closed gate. See re
CAS04476-664	SA_350-700	-117.41889006	33.739489053		6	Cannot access S06
CAS04476-667	SA_350-700	-117.42599419	34.185305045		4	See report Guarino.
CAS04476-670	SA_350-700	-117.54024949	34.099951385		3	San Bernadino Flood Control District; F05; with water; Baseline Rd. & Center; Arrow Ave & Ro
CAS04476-672	SA_350-700	-117.56291116	33.778757660		5	
CAS04476-679	SA_350-700	-117.57675815	34.109532159		3	San Bernadino Flood Control District; F05; with water; Baseline Rd. & Center
CAS04476-681	SA_350-700	-117.37758948	33.726117752		4	Location was blocked of by large fence. See report AdamNickJesse

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-683	SA_350-700	-117.56719874	34.126332558		4	
CAS04476-696	SA_350-700	-117.64618897	33.745433501		4	awesome site right near turn off See report classproject_F04
CAS04476-708	SA_350-700	-117.35856255	34.166958142		6	*****No water July 2005
CAS04476-717	SA_350-700	-117.18557478	34.102876746		4	Escort required. Near the intersection of Boulder and Orange. See report MasonGroup.
CAS04476-738	SA_350-700	-117.58080582	34.100906036		6	No site; House; F05
CAS04476-743	SA_350-700	-117.32534276	33.836098157		5	
CAS04476-744	SA_350-700	-117.26625089	34.173446907		3	*Campus Crusade property. 7-23-05
CAS04476-002	SA_700+	-117.06210253	34.144227205	Y	2	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-007	SA_700+	-116.96380672	34.094982144	Y	2	38→Vista Point; F05
CAS04476-009	SA_700+	-116.92728578	34.024254849		6	Neighbors informed us that daily civil was re-enactments occur here. Additionally, landowner a
CAS04476-014	SA_700+	-117.62619063	34.183644702	Y	2	Cucamonga Canyon Day use area. See report Team_Cucamanga.
CAS04476-022	SA_700+	-116.87148271	34.158421091	Y	6	*Access (Y); Water (y); Width (<1 m); Cell Servcice (N). Heavy Vegetation
CAS04476-024	SA_700+	-116.97149836	34.270353360		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-025	SA_700+	-116.98365700	34.173217837		6	4wd required; Seven Oaks Rd. F05; no recon; Did not locate; private property, no information 1
CAS04476-027	SA_700+	-117.47032066	34.306522607	Y	2	Off hwy 15 Cajon wash area. See report classproject_F04
CAS04476-034	SA_700+	-116.93008031	34.089394000	Y	2	Valley of the Falls; F05; Check in at Mortenson Hall (S06), will allow us access.
CAS04476-035	SA_700+	-116.87489914	34.077479169	Y	2	Forest adventure pass; no recon; F05; 1.5km hike from parking in Falls day use area
CAS04476-041	SA_700+	-117.45881358	34.295482569		2	Off hwy 15 Cajon wash area; Sampled in pilot Su05; Use coordinates 34.29606; -117.45789
CAS04476-044	SA_700+	-116.88597440	34.251884753		4	site located across field behind shopping center, field possibly soon to be developed. See rep
CAS04476-045	SA_700+	-117.01100719	33.941822452		6	Dry wash. See report canfield-pernot.
CAS04476-050	SA_700+	-116.79313821	34.156260800		3	On USFS correctional facility, Need permission to access. See report King.
CAS04476-053	SA_700+	-116.96961406	34.168487611		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-057	SA_700+	-117.54807500	34.250969323		4	4wd recommended; 15→Sierra Ave (north)→Middle Fork Rd (left); no recon; upstream of 069
CAS04476-061	SA_700+	-116.89869514	34.133646395		5	
CAS04476-062	SA_700+	-117.45607871	34.211291766		2	15→Sierra Ave/Lytle Creek Rd
CAS04476-064	SA_700+	-116.85102849	34.076769126		5	
CAS04476-065	SA_700+	-116.90646360	34.095559787		4	Forest adventure pass; no recon; F05
CAS04476-067	SA_700+	-117.04563130	34.143509392		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-068	SA_700+	-117.64659571	34.272031026		5	
CAS04476-069	SA_700+	-117.51336610	34.247280852		2	15→Sierra Ave (north)→Middle Fork Rd (left); 4wd recommended;S06
CAS04476-073	SA_700+	-117.11919677	34.172023144		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-074	SA_700+	-116.88367563	34.087671859		4	Forest adventure pass; no recon; F05
CAS04476-075	SA_700+	-117.05126295	34.160705056		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-080	SA_700+	-116.88341637	34.150702356		6	*Access (Y); Water (N); Width (?); Cell Servcice (N). Off of Forsee Creek trail
CAS04476-083	SA_700+	-117.18172004	34.213177636		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-084	SA_700+	-117.63465530	34.263212356		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-087	SA_700+	-116.80899232	34.162933287		3	*Access (Y); Water (y); Width (1-3 m); Cell Servcice (N). May be correctional facility property,
CAS04476-088	SA_700+	-117.55276240	34.204666843		5	
CAS04476-093	SA_700+	-116.88312457	34.168940029		2	*Access (Y); Water (y); Width (1-2 m); Cell Servcice (N). Barton Flats Road off of Jenks Lake
CAS04476-097	SA_700+	-116.96341929	34.065988343		3	dp says a spring feeds the lower section o this stream and it has water year round. See report
CAS04476-100	SA_700+	-116.93768278	34.226941391		5	
CAS04476-103	SA_700+	-116.97502510	34.063052985		4	Area surrounded by grass road sides. Sample was taken here. Mayflies, small grubs,
CAS04476-105	SA_700+	-117.49262017	34.252726286		6	No water; S06
CAS04476-106	SA_700+	-116.89198883	34.149204108		2	*Access (Y); Water (?); Width (?); Cell Servcice (N). Initially did not locate site, however, wate
CAS04476-112	SA_700+	-117.46857001	34.261404860		5	
CAS04476-118	SA_700+	-117.48174507	34.283653366		5	
CAS04476-124	SA_700+	-117.07694005	34.127623398		6	No access found to this site. No roads or trails. See report MasonGroup.
CAS04476-126	SA_700+	-116.89422285	34.174274525		2	*Access (Y); Water (y); Width (3-5 m); Cell Servcice (N). On Glass Road; Sampled n pilot Su0
CAS04476-127	SA_700+	-117.57169450	34.173434996		4	
CAS04476-128	SA_700+	-117.25102705	34.204878368		4	Gated area. Might be dirt roads to these sites. The area is part of San Bernardino
CAS04476-131	SA_700+	-116.97463363	34.185592446		5	
CAS04476-148	SA_700+	-116.80569735	34.222622649		5	
CAS04476-156	SA_700+	-117.13321631	34.152483830		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-158	SA_700+	-117.25644457	34.210028426		4	Gated area. Might be dirt roads to these sites. The area is part of San Bernardino
CAS04476-161	SA_700+	-117.56533529	34.252833674		5	
CAS04476-168	SA_700+	-116.84719627	34.178877627		2	*Access (Y); Water (y); Width (3-8 m); Cell Servcice (N). Across street from South Fork Camp
CAS04476-174	SA_700+	-117.55002626	34.289306964		4	Paved road ends at Lytle Creek Firing Range. Inaccessable with low clearance vehicle. Proba
CAS04476-181	SA_700+	-117.25552157	34.210648364		5	
CAS04476-184	SA_700+	-117.01389579	34.164730048		5	
CAS04476-185	SA_700+	-117.55534566	34.207824684		5	
CAS04476-192	SA_700+	-117.54357715	34.194402730		5	
CAS04476-202	SA_700+	-116.88737915	34.094754480		4	Forest adventure pass; no recon; F05
CAS04476-203	SA_700+	-116.91927125	34.187306943		2	Seven Oaks Rd; F05
CAS04476-205	SA_700+	-117.45409621	34.206219556		2	15→Sierra Ave (Right) S06
CAS04476-217	SA_700+	-117.13358103	34.163362120		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-219	SA_700+	-116.98658846	34.113040115		3	Religious retreat; no recon F05
CAS04476-221	SA_700+	-116.88977895	34.299483681		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-224	SA_700+	-116.84479496	34.094888983		5	
CAS04476-225	SA_700+	-117.13315916	34.147138497		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-232	SA_700+	-117.19963879	34.213985520		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-233	SA_700+	-117.46551605	34.269633189		5	
CAS04476-240	SA_700+	-117.08667617	34.167550520		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-245	SA_700+	-117.03983027	34.144556360		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-247	SA_700+	-117.18275674	34.187722785		3	*This is one of the City Creek sites we reconned, just past the Forest Service station. Need pe
CAS04476-248	SA_700+	-116.80596977	34.253510250		6	GPS location in middle of field, no stream could be found. See report King
CAS04476-250	SA_700+	-117.50305917	34.232646583		5	
CAS04476-251	SA_700+	-116.93386841	34.232477261		5	
CAS04476-252	SA_700+	-116.89050988	34.135897017		5	
CAS04476-254	SA_700+	-116.98350932	34.174708164		4	4wd required; no recon; S06
CAS04476-264	SA_700+	-116.79951301	34.215357610		5	
CAS04476-266	SA_700+	-117.00037244	34.226462739		5	
CAS04476-271	SA_700+	-117.47315398	34.230050206		2	Alt GPS ~ 34.22911 N, -117.47414 W; S06
CAS04476-272	SA_700+	-116.91351594	34.087758788		2	Valley of the Falls; F05
CAS04476-276	SA_700+	-116.87325758	34.113683437		5	
CAS04476-282	SA_700+	-117.16320573	34.202994755		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-284	SA_700+	-117.07144170	34.156719185		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-289	SA_700+	-117.45338167	34.286105327		6	Less than 150 m long & 1 m wide; S06
CAS04476-296	SA_700+	-116.97496591	34.164792321		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-301	SA_700+	-116.87607633	34.286860131		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-302	SA_700+	-117.56202199	34.292494801		4	See report Guarino.
CAS04476-304	SA_700+	-117.14980719	34.184519465		6	*****Bad access; extremely steep slope, unsafe condition
CAS04476-309	SA_700+	-117.45251679	34.270518072		2	15N→Cleghorn (left)→Cajon Rd→Swarthout (left)→Dirt Parking on left
CAS04476-317	SA_700+	-117.37228714	34.236827881		5	
CAS04476-329	SA_700+	-117.00232529	34.047711504		2	Area surrounded by grass road sides. Sample was taken here. Mayflies, small grubs,
CAS04476-333	SA_700+	-116.86494298	34.076697831		4	Forest adventure pass; no recon; F05
CAS04476-334	SA_700+	-116.87714953	34.183026198		2	*Access (Y); Water (y); Width (5-8 m); Cell Servcice (N). Across street from South Fork Camp
CAS04476-335	SA_700+	-116.97944159	34.053338399		3	not long enough due to physical barriers (man made), good stream, area very altered. See rep
CAS04476-344	SA_700+	-116.81249470	34.167080345		6	*Access (Y); Water (N); Width (1-3); Cell Servcice (N). May have water in earlier months. F05
CAS04476-345	SA_700+	-117.06221856	34.077614289		6	No water F05
CAS04476-346	SA_700+	-117.49748156	34.234610240		6	Dry wash; S06
CAS04476-348	SA_700+	-117.19286770	34.192986436		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-349	SA_700+	-116.84446924	34.136866552		5	
CAS04476-357	SA_700+	-116.97633379	34.052865213		3	park on side of road "Potato Canyon" and walk down dirt road to right. See repot canfield-pern
CAS04476-358	SA_700+	-117.06896428	34.152038460		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-359	SA_700+	-116.87808557	34.139896308		5	
CAS04476-362	SA_700+	-117.49781401	34.238745931		6	Dry wash; S06
CAS04476-370	SA_700+	-117.02320237	34.100128875		4	unable to get down slope to stream, trail leads down, should be able to get to site. See report
CAS04476-371	SA_700+	-116.95391171	34.046292732		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-372	SA_700+	-117.00740866	34.161577871		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-376	SA_700+	-116.82663306	34.170317911		2	*Access (Y); Water (y); Width (3-5 m); Cell Servcice (N). In South Fork Campground; Sample
CAS04476-377	SA_700+	-117.07302448	34.158367434		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-380	SA_700+	-116.88019068	34.165881857		2	*Access (N); Water (Y); Width (1-2); Cell Servcice (N). Access extremely restricted. Either ste
CAS04476-382	SA_700+	-117.51687281	34.267436958		4	~15m from car to site. Hiked down small wash from road to site. See report Guarino.
CAS04476-385	SA_700+	-116.96977180	34.239164363		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-388	SA_700+	-116.88403117	34.105241104		5	
CAS04476-389	SA_700+	-117.13213526	34.164314179		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-390	SA_700+	-116.78646466	34.140210900		5	
CAS04476-397	SA_700+	-116.79825378	34.179724042		5	
CAS04476-399	SA_700+	-116.87066625	34.285392379		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-401	SA_700+	-116.85592412	34.078062164		4	Forest adventure pass; no recon; F05
CAS04476-402	SA_700+	-116.80223448	34.235978139		3	Site supposed to be directly off road but could not be located. See report King. Private proper
CAS04476-407	SA_700+	-116.79796898	34.160730746		3	Road to access site leads to correctional facility (Camp Heart Bar). See report King.
CAS04476-408	SA_700+	-117.19653595	34.199413427		4	This site is not accessible by roads or hiking trials that we could find. This site
CAS04476-415	SA_700+	-117.06464644	34.075453513		6	No access F05
CAS04476-416	SA_700+	-117.63080726	34.173737765		5	
CAS04476-417	SA_700+	-116.99387449	34.168628401		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-424	SA_700+	-117.51718920	34.193090486		5	
CAS04476-425	SA_700+	-117.17439371	34.187958721		4	Site is straight down from the turnout to the stream - off Hwy 330. Tough access. See report M
CAS04476-427	SA_700+	-116.88240841	34.289630678		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-431	SA_700+	-116.77971087	34.119948177		5	
CAS04476-433	SA_700+	-116.77862554	34.131926207		5	
CAS04476-434	SA_700+	-116.96983776	34.240215268		6	*****No water August 2005 See BigBear_RiversideReconn.
CAS04476-435	SA_700+	-116.78817393	34.155281907		4	*Access (Limited); Water (y); Width (0.5-2 m); Cell Servcice (N). Heavy Vegetation; low water
CAS04476-436	SA_700+	-117.01051986	34.176437260		5	
CAS04476-438	SA_700+	-116.77822295	34.167029090		6	*Access (Limited); Water (y); Width (<1 m); Cell Servcice (N). Heavy Vegetation
CAS04476-445	SA_700+	-116.93402578	34.165429458		2	Call ahead to make sure gate is open (909) 794-2911; 7th Day Adventist Camp Cedar Falls. C
CAS04476-446	SA_700+	-117.18467771	34.185554414		3	*****This is one of the City Creek sites we reconned, just past the Forest Service station. Need pe
CAS04476-447	SA_700+	-117.37074527	34.230470936		5	
CAS04476-448	SA_700+	-116.94653112	34.182093547		5	
CAS04476-449	SA_700+	-117.05280822	34.039140634		6	urban paved city housing track. See report canfield-pernot.
CAS04476-452	SA_700+	-116.93746133	34.008165827		6	Neighbors informed us that daily civil was re-enactments occur here. Additionally, landowner a
CAS04476-455	SA_700+	-117.17826507	34.198810740		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-458	SA_700+	-116.89462794	34.085716852		4	Forest adventure pass; no recon; F05
CAS04476-461	SA_700+	-116.88534717	34.085749318		4	Forest adventure pass; no recon; F05

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-463	SA_700+	-117.17698422	34.192896935		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-464	SA_700+	-117.32914766	34.255724692		5	
CAS04476-470	SA_700+	-116.92900363	34.156429727		6	No water F05
CAS04476-474	SA_700+	-117.62388138	34.247698211		5	
CAS04476-476	SA_700+	-117.00006856	34.227416908		5	
CAS04476-477	SA_700+	-116.90273975	34.113898756		5	
CAS04476-478	SA_700+	-116.94550549	34.173583752		2	Seven Oaks Rd; F05; requires permission from unknown or new GPS coordinate
CAS04476-482	SA_700+	-116.99029277	34.107282862		3	Religious retreat; no recon F05
CAS04476-483	SA_700+	-117.45662048	34.251143264		5	
CAS04476-485	SA_700+	-117.63267847	34.270236849		5	
CAS04476-488	SA_700+	-116.96920118	34.154049258		6	Steep slope, dense vegetation; cannot access S06
CAS04476-490	SA_700+	-116.80191506	34.140521005		5	
CAS04476-492	SA_700+	-116.92702434	34.152633742		6	No water F05
CAS04476-499	SA_700+	-117.22713256	34.175154091		5	
CAS04476-500	SA_700+	-117.47521085	34.279128255		5	
CAS04476-501	SA_700+	-116.94243245	34.091894550		2	38→Valley of the Falls (Right)→Canyon (corner); F05
CAS04476-512	SA_700+	-117.01220494	34.173085053		5	
CAS04476-517	SA_700+	-117.20297727	34.219136078		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-519	SA_700+	-116.80807482	34.152129611		5	
CAS04476-523	SA_700+	-117.18476127	34.202649971		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-527	SA_700+	-117.51506755	34.266105603		4	6m from road. Viable site. No offroad parking, park on side of road. Traffic=1car/10. See report
CAS04476-530	SA_700+	-116.90612836	34.177999389		2	Walking distance from 126
CAS04476-531	SA_700+	-117.19700543	34.195872672		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-533	SA_700+	-117.04279582	34.087398091		4	Road will take you past sage scrub habitat but still need to walk over rocks. See report King.
CAS04476-537	SA_700+	-116.84896798	34.148918245		5	
CAS04476-538	SA_700+	-116.99195734	34.125067539		5	
CAS04476-554	SA_700+	-117.19146182	34.217161245		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-555	SA_700+	-116.87534778	34.101143636		4	Forest adventure pass; no recon; F05
CAS04476-556	SA_700+	-117.57095306	34.254295925		5	
CAS04476-560	SA_700+	-116.90550246	34.193909582		5	
CAS04476-565	SA_700+	-117.20584249	34.201636790		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-569	SA_700+	-116.77867912	34.126192023		5	
CAS04476-571	SA_700+	-117.04882778	34.164592089		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-575	SA_700+	-116.99336598	34.098622127		2	Old Mill Creek Rd→Cienega; F05
CAS04476-576	SA_700+	-117.20815336	34.209098955		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-577	SA_700+	-116.84300783	34.158370539		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-579	SA_700+	-117.33209920	34.216286296		5	
CAS04476-581	SA_700+	-117.04367007	34.169088346		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-588	SA_700+	-117.01185224	34.200629473		5	
CAS04476-590	SA_700+	-116.83405733	34.172558457		2	*Access (Y); Water (y); Width (3-5 m); Cell Servcice (N). Across street from South Fork Camp
CAS04476-596	SA_700+	-116.98209641	34.239709792		4	*****Bear Creek just below Bear Lake. Very steep, difficult access. August 2005 See BigBear_R
CAS04476-600	SA_700+	-117.48137939	34.231646284		2	Site is located at turnout on main Lytle Creek Road - Hike 0.15 miles from road. 1 Mile upstrea
CAS04476-607	SA_700+	-116.86620096	34.182687774		2	*Access (Y); Water (y); Width (5-8 m); Cell Servcice (N). Across street from South Fork Camp
CAS04476-617	SA_700+	-117.58318119	34.302538731		4	See report Guarino.
CAS04476-618	SA_700+	-116.80664040	34.161238996		4	*Access (Y); Water (y); Width (1-3 m); Cell Servcice (N). May be correctional facility property,
CAS04476-620	SA_700+	-117.57056718	34.215784697		5	
CAS04476-621	SA_700+	-116.97168590	34.203631513		5	
CAS04476-623	SA_700+	-116.84293299	34.126465514		5	
CAS04476-627	SA_700+	-116.93968510	34.048672570		3	could be good sampling area at higher elevation (call DP). See report canfield-pernot.
CAS04476-641	SA_700+	-116.90790071	34.091972403		4	Forest adventure pass; no recon; F05
CAS04476-642	SA_700+	-117.12585391	34.180123683		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-648	SA_700+	-116.95755874	34.165472755		5	
CAS04476-653	SA_700+	-117.52595118	34.272302722		2	~15m from car to site. 2 boulders on side of road mark trail to site (See photo). See report Gua
CAS04476-654	SA_700+	-116.84558187	34.088333257		5	
CAS04476-660	SA_700+	-116.99146335	34.235420105		4	*****Bear Creek just below Bear Lake. Very steep, difficult access. August 2005 See BigBear_R
CAS04476-663	SA_700+	-117.57099807	34.182368336		4	
CAS04476-668	SA_700+	-116.97040011	34.188968319		5	
CAS04476-674	SA_700+	-117.16680164	34.195891817		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-675	SA_700+	-117.17691629	34.181659533		6	*****Gated private property, very little water (<.3 m wide). July 2005
CAS04476-677	SA_700+	-117.20569085	34.205460983		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-684	SA_700+	-116.91269423	34.181830744		5	
CAS04476-686	SA_700+	-116.88845419	34.169199506		2	*Access (Y); Water (y); Width (1-2 m); Cell Servcice (N). Barton Flats Road off of Jenks Lake
CAS04476-687	SA_700+	-117.14271851	34.167715386		4	Could not access original site by vehicle (need an SUV, truck, or 4-wheel drive). See report M
CAS04476-692	SA_700+	-117.06382047	34.169851908		4	Access is via a dirt SUV/4X4 truck trial and we were driving a car which is why we d
CAS04476-693	SA_700+	-117.51938960	34.303168280		5	
CAS04476-694	SA_700+	-116.94292506	34.179946667		5	
CAS04476-695	SA_700+	-117.01835988	34.097615179		4	can't get over mountain to stream
CAS04476-698	SA_700+	-116.94289789	34.006061815		6	Neighbors informed us that daily civil was re-enactments occur here. Additionally, landowner a
CAS04476-700	SA_700+	-116.89227476	34.148064280		2	*Access (Y); Water (?); Width (?); Cell Servcice (N). Initially did not locate site, however, wate
CAS04476-702	SA_700+	-117.13419498	34.158917949		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-704	SA_700+	-117.15664061	34.213837540		6	This site is not accessible by roads or hiking trials that we could find. See report MasonGroup.
CAS04476-706	SA_700+	-117.54548478	34.199318542		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-707	SA_700+	-117.37259278	34.240893793		5	
CAS04476-711	SA_700+	-116.98150111	34.181573651		5	
CAS04476-712	SA_700+	-116.92681052	34.180224793		2	Seven Oaks Rd; F05
CAS04476-713	SA_700+	-117.63098885	34.249199816		2	Sampled in pilot Su05; Use coordinates 34.24960; -117.63424
CAS04476-716	SA_700+	-117.24962305	34.201098451		4	Gated area. Might be dirt roads to these sites. The area is part of San Bernardino
CAS04476-719	SA_700+	-116.93638220	34.222364089		5	
CAS04476-721	SA_700+	-116.94855231	34.269782716		2	*Grout Creek. Created alt. site 60m from original because original had no H2O. N34.26924 W
CAS04476-722	SA_700+	-117.05898607	34.152385879		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-723	SA_700+	-116.99771180	34.161269456		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-727	SA_700+	-117.49392202	34.234781296		2	Site is located at bridge at Green Mountain Road bridge at Lytle Creek Road. See report Guar
CAS04476-733	SA_700+	-117.12858769	34.169223192		4	Tough access. See report MasonGroup and aerial/topo maps.
CAS04476-736	SA_700+	-116.95251478	34.194128944		5	
CAS04476-739	SA_700+	-116.98492666	34.161502737		4	4wd required; Seven Oaks Rd. F05; no recon
CAS04476-740	SA_700+	-117.35990110	34.243375184		5	
CAS04476-741	SA_700+	-116.83568918	34.162378048		5	
CAS04476-746	SA_700+	-116.89758261	34.176025543		4	Could not get to orginal site due to dense forest and slope. See report King.
CAS04476-748	SA_700+	-117.08128092	34.163425325		4	Access is via a dirt SUV/4X4 truck trial. See report MasonGroup.
CAS04476-021	SJ_350-700	-117.22126212	33.833625037		6	Manmade trench less than 150m long;
CAS04476-030	SJ_350-700	-117.12836975	33.845976953		6	Agriculture/Pasture; No water in vicinity S06
CAS04476-031	SJ_350-700	-116.94005724	33.675723459		3	Private Property; Gated with Locks; No reconn (Caldwell; 40751 Grieco Way; Hemet) Need pe
CAS04476-033	SJ_350-700	-117.03503580	33.798361548		6	Dry concrete line channel F05
CAS04476-036	SJ_350-700	-117.39745581	33.676683307		6	Housing; no water in vicinity; S06
CAS04476-038	SJ_350-700	-117.03209094	33.775947465		6	Agriculture/Pasture; No water in vicinity (30 May 06)
CAS04476-049	SJ_350-700	-117.04524655	33.817180322		6	Metropolitan Water District S06; viable with permission; We do not sample MWD
CAS04476-058	SJ_350-700	-117.33163907	33.645896390		6	Located in Lake Elsinore S06
CAS04476-095	SJ_350-700	-117.09649019	33.830715336	Y	4	Road closed at time of recon (F05)
CAS04476-096	SJ_350-700	-116.84360646	33.779223169		6	Inaccessable canyon 30May06
CAS04476-111	SJ_350-700	-116.96351861	33.853966290		6	Inaccessable canyon 09June06
CAS04476-116	SJ_350-700	-117.27871316	33.664073369	Y	2	Wadeable; overgrown with sedges; bushwacking required
CAS04476-125	SJ_350-700	-117.23992708	33.833607467		6	Inaccessible, paved road ends at Lytle Creek Firing Range. Upstream sites not access
CAS04476-130	SJ_350-700	-117.02225881	33.728110331	Y	3	Riverside County Flood Control and Water Conservation District; viable with permission S06
CAS04476-135	SJ_350-700	-116.86931693	33.761154703		6	Sabobo Indian Reservation; no water 02June06
CAS04476-159	SJ_350-700	-116.83085787	33.738773918		3	Lake Hemet Municipal Water District; viable with permission S06
CAS04476-160	SJ_350-700	-116.81068772	33.731419450	Y	1	Located off of Hwy 74 (few hundred feet); Sampled 07June06
CAS04476-173	SJ_350-700	-117.01423073	33.779932657		6	Agriculture/Pasture; No water in vicinity (30 May 06)
CAS04476-183	SJ_350-700	-117.06453889	33.696816497		6	San Diego Aquaduct; Not viable 07June06

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-187	SJ_350-700	-117.04276625	33.717964432		6	No site; Agriculture 06June06
CAS04476-211	SJ_350-700	-116.89248335	33.781359172		6	Sabobo Indian Reservation; Gated; Dries in summer months 02June06
CAS04476-214	SJ_350-700	-117.02950646	33.786909133		6	Not Riverine Wetland -- Metropolitan Water District F05; viable with permission; We do not sam
CAS04476-235	SJ_350-700	-117.03529309	33.734188132		6	No site; Agriculture 06June06
CAS04476-239	SJ_350-700	-117.31301887	33.656147292		6	Located on Lake Elsinore 06June06
CAS04476-241	SJ_350-700	-117.13402022	33.831959349		6	Agriculture/Pasture; No water in vicinity S06
CAS04476-242	SJ_350-700	-117.07866883	33.838174883		6	Colorado River Aquaduct; Not viable 07June06
CAS04476-243	SJ_350-700	-117.20906791	33.829108898	Y	1	Located off of Rider Street (f05); Sampled 07June06
CAS04476-263	SJ_350-700	-116.88711797	33.786232490		6	Saboba Indian Reservation; no water 02June06
CAS04476-279	SJ_350-700	-117.03324558	33.769541294		6	not riverine wetland -- Metropolitan Water District (MWD) F05; viable with permission; We do n
CAS04476-280	SJ_350-700	-116.85404219	33.764701060		6	Sabobo Indian Reservation/Eastern Municipal Water District; No water 02June06
CAS04476-281	SJ_350-700	-117.18629194	33.778578663		6	No water F05
CAS04476-288	SJ_350-700	-116.93010481	33.673218103		3	Private Property; Gated with Locks; No reconn (Caldwell; 40751 Grieco Way; Hemet) Need pe
CAS04476-290	SJ_350-700	-117.13923319	33.834852122		6	No water F05
CAS04476-291	SJ_350-700	-117.03728609	33.804306203		6	Metropolitan Water District (MWD) F05; viable with permission; We do not sample MWD
CAS04476-307	SJ_350-700	-117.24341445	33.736844523		6	No water 02June06
CAS04476-313	SJ_350-700	-117.00529067	33.791175303		6	No access F05
CAS04476-314	SJ_350-700	-117.02190112	33.866527441		6	No water 02June06
CAS04476-320	SJ_350-700	-117.04068046	33.722385590		6	San Diego Aquaduct; Not viable 07June06
CAS04476-331	SJ_350-700	-117.23341205	33.745602791	Y	6	Dry creek 07June06
CAS04476-342	SJ_350-700	-117.20608871	33.822613181		6	Located off of Rider Street (f05); Perris Valley Storm Drain; We do not Sample these
CAS04476-347	SJ_350-700	-116.99166922	33.845882299	Y	2	Sanderson & Gilman Springs; 1/2 mile hike (easy trail) F05
CAS04476-360	SJ_350-700	-117.00249111	33.799270667		3	Located on Private Property (no information/no recon) F05
CAS04476-367	SJ_350-700	-117.15768774	33.812025428		6	Agriculture/Pasture; No water in vicinity S06
CAS04476-378	SJ_350-700	-117.07427480	33.837548267		5	
CAS04476-381	SJ_350-700	-117.02235092	33.791113946		6	Located on Dairy farm; no water in site F05
CAS04476-392	SJ_350-700	-117.13051513	33.844300304		5	
CAS04476-394	SJ_350-700	-116.88519402	33.764291945		5	
CAS04476-409	SJ_350-700	-117.21220811	33.848443966		6	Off of LaSalle Rd F05; Perris Valley Storm Drain; We do not sample
CAS04476-423	SJ_350-700	-117.04498086	33.703140409		5	
CAS04476-426	SJ_350-700	-116.98517910	33.851916744		2	Above site 347 waterfall; further hike F05
CAS04476-428	SJ_350-700	-117.00988534	33.836878393		3	Gated entry (no information/no recon) F05
CAS04476-440	SJ_350-700	-116.84812169	33.691146885		5	
CAS04476-451	SJ_350-700	-116.89733919	33.747400289		5	
CAS04476-453	SJ_350-700	-116.82761685	33.738831010		5	
CAS04476-454	SJ_350-700	-117.03928312	33.725729664		5	

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-456	SJ_350-700	-117.10425888	33.857270705		6	Dry Streambed S06
CAS04476-457	SJ_350-700	-116.88942628	33.731443816		5	
CAS04476-459	SJ_350-700	-117.25842298	33.727578175		5	
CAS04476-460	SJ_350-700	-116.87738913	33.718539331		5	
CAS04476-471	SJ_350-700	-117.05173884	33.705451974		5	
CAS04476-489	SJ_350-700	-117.00514446	33.721647532		5	
CAS04476-514	SJ_350-700	-117.20857593	33.763992576		5	
CAS04476-515	SJ_350-700	-117.32023988	33.652172389		5	
CAS04476-516	SJ_350-700	-117.08833414	33.860186950		6	Dry Streambed S06
CAS04476-522	SJ_350-700	-117.08463424	33.834875284		5	
CAS04476-526	SJ_350-700	-117.01700275	33.758163743		5	
CAS04476-540	SJ_350-700	-116.90669375	33.758046696		5	
CAS04476-587	SJ_350-700	-116.80289469	33.721674540		5	
CAS04476-597	SJ_350-700	-117.03589827	33.759390953		6	Metropolitan Water District (MWD)/Access via Bonnie Acres Ranch F05; viable with permissio
CAS04476-609	SJ_350-700	-117.01621526	33.729404965		3	Riverside County Flood Control and Water Conservation District; viable with permission S06
CAS04476-619	SJ_350-700	-117.38780620	33.677181154		5	
CAS04476-624	SJ_350-700	-117.20529249	33.808669641		6	No water F05
CAS04476-630	SJ_350-700	-116.79505034	33.716761015		5	
CAS04476-631	SJ_350-700	-117.03348201	33.791338177		6	Metropolitan Water District F05; viable with permission; We do not sample MWD
CAS04476-632	SJ_350-700	-117.04664740	33.847355479		4	Road closed at time of recon (F05)
CAS04476-643	SJ_350-700	-117.01991487	33.881676812		5	
CAS04476-644	SJ_350-700	-116.85571496	33.747014663		5	
CAS04476-649	SJ_350-700	-117.03421356	33.844864011		5	
CAS04476-650	SJ_350-700	-117.11392884	33.853773799		6	Dry Streambed S06
CAS04476-655	SJ_350-700	-117.20431041	33.790351697		6	No water F05
CAS04476-657	SJ_350-700	-116.99993245	33.838543723		2	Had water in F05
CAS04476-662	SJ_350-700	-117.16809422	33.798371512		6	No water F05
CAS04476-676	SJ_350-700	-117.21218020	33.865420649		2	Off of LaSalle Rd F05
CAS04476-678	SJ_350-700	-117.24234221	33.833600162		5	
CAS04476-680	SJ_350-700	-117.04963598	33.826143231		5	
CAS04476-682	SJ_350-700	-117.05153828	33.695920134		5	
CAS04476-701	SJ_350-700	-117.04412602	33.715266626		5	
CAS04476-715	SJ_350-700	-117.06244220	33.693895614		5	
CAS04476-718	SJ_350-700	-117.19661028	33.779405642		6	No water F05
CAS04476-724	SJ_350-700	-117.18021216	33.792964816		6	No water F05
CAS04476-730	SJ_350-700	-117.40699992	33.677437953		5	

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CAS04476-731	SJ_350-700	-117.03098240	33.742465081		5	
CAS04476-735	SJ_350-700	-117.15809662	33.811518248		6	No water F05
CAS04476-008	SJ_700+	-116.79208230	33.742664829		6	Inaccessable (slope and brush); F05
CAS04476-020	SJ_700+	-116.68733438	33.768420077	Y	1	Initial site located on private property; alt GPS; Sampled 16June06
CAS04476-039	SJ_700+	-116.67197921	33.665718885		6	No water F05
CAS04476-054	SJ_700+	-116.72340167	33.662864104		4	2-mile hike; no recon F05
CAS04476-070	SJ_700+	-116.76762278	33.771511380	Y	1	4wd required; Sampled 17June06
CAS04476-078	SJ_700+	-116.81476492	33.790420550		6	Inaccessable canyon 16June06
CAS04476-107	SJ_700+	-116.81339966	33.645986466		3	California Department of Corrections; has water F05
CAS04476-123	SJ_700+	-117.43630207	33.668855883		5	Mountaintop!
CAS04476-147	SJ_700+	-116.74484714	33.792901433		6	Steep slope; cannot access 30May06
CAS04476-155	SJ_700+	-116.77368946	33.810719775		3	Ecological Study Area behind Lake Fulmor; no recon S06
CAS04476-163	SJ_700+	-116.74773747	33.793937425		6	Endangered species habitat 30May06
CAS04476-172	SJ_700+	-116.83797267	33.784315302	Y	1	4x4 required. Alt GPS required; have to access through waterway leading to contamination of s
CAS04476-188	SJ_700+	-116.82917602	33.804177585		6	243→4S05→4S06; 4wd required; S06;Inaccessable canyon 16June06
CAS04476-189	SJ_700+	-116.83066048	33.838845218		6	Dry creek S06
CAS04476-196	SJ_700+	-116.72637091	33.777818159		4	Private Property; No info; no recon F05
CAS04476-206	SJ_700+	-116.74231339	33.731890431	Y	1	243→Tollgate Rd F05; Sampled 16June06
CAS04476-212	SJ_700+	-116.66060118	33.740061693		4	4wd required; did not recon F05
CAS04476-218	SJ_700+	-116.74103184	33.808421146		6	Endangered species habitat 17June06
CAS04476-228	SJ_700+	-116.81978561	33.791570162		5	
CAS04476-257	SJ_700+	-116.82308568	33.789653765		5	
CAS04476-267	SJ_700+	-116.67801271	33.674169837		2	Original GPS located on private property; alt GPS F05
CAS04476-268	SJ_700+	-116.75853362	33.685585127		5	
CAS04476-269	SJ_700+	-116.83547908	33.791488938		4	243→4S05→4S06; 4wd required; S06; no recon
CAS04476-270	SJ_700+	-116.75086338	33.728587032		4	243→Tollgate Rd F05
CAS04476-286	SJ_700+	-116.81659916	33.653887189	Y	2	74E→Fairview Ave→Bautista Rd; F05
CAS04476-297	SJ_700+	-116.81235377	33.809684475		5	
CAS04476-311	SJ_700+	-116.75874747	33.706124387		6	No water F05
CAS04476-322	SJ_700+	-116.77713525	33.709454084		6	No water F05
CAS04476-336	SJ_700+	-116.75413411	33.817195103		5	
CAS04476-363	SJ_700+	-116.76095529	33.619755221		4	F05; check for alternate access
CAS04476-365	SJ_700+	-116.70924933	33.663736655		3	Lake Hemet Municipal Water District; no recon S06
CAS04476-373	SJ_700+	-116.77805145	33.628672096		2	74E→Fairview Ave→Bautista Rd; F05; alt GPS
CAS04476-375	SJ_700+	-116.70164416	33.756564096		3	Private Property; no recon F05
CAS04476-379	SJ_700+	-116.65499090	33.662140047		4	74S→Little Thomas Mountain Rd/6S13; did not locate S06

SITEID	CATEGORY	LONDD	LATDD	CRAM	Status	COMMENTS
CAS04476-383	SJ_700+	-116.71993741	33.811026429		5	
CAS04476-384	SJ_700+	-116.75915716	33.723312270		5	
CAS04476-405	SJ_700+	-116.74243274	33.774076584		5	
CAS04476-410	SJ_700+	-116.77024503	33.758854379		5	
CAS04476-413	SJ_700+	-116.76050588	33.792056328		5	
CAS04476-419	SJ_700+	-116.71210696	33.742569867		2	Possible private property; no info F05
CAS04476-472	SJ_700+	-116.75993159	33.811381455		5	
CAS04476-484	SJ_700+	-116.82052651	33.659625124	Y	2	74E→Fairwiew Ave→Bautista Rd; F05
CAS04476-496	SJ_700+	-116.67953316	33.693205086		5	
CAS04476-508	SJ_700+	-116.67965109	33.706462975		5	
CAS04476-513	SJ_700+	-116.76078821	33.720333877		5	
CAS04476-520	SJ_700+	-116.67350702	33.726089240		5	
CAS04476-535	SJ_700+	-116.72252483	33.739027674		2	off of 243; F05
CAS04476-539	SJ_700+	-116.66209432	33.738597824		5	
CAS04476-543	SJ_700+	-116.73215125	33.802100132		5	
CAS04476-563	SJ_700+	-116.77027130	33.693607171		5	
CAS04476-568	SJ_700+	-116.73811858	33.665767156		5	
CAS04476-578	SJ_700+	-116.67191020	33.720352052		5	
CAS04476-580	SJ_700+	-116.77644684	33.773727288		2	243→Pine Cove Rd→San Jacinto Ridge Rd; F05; alt GPS
CAS04476-586	SJ_700+	-116.74129093	33.668629925		5	
CAS04476-603	SJ_700+	-116.78210525	33.707601846		6	No water F05
CAS04476-605	SJ_700+	-116.72533355	33.738246156		2	243→Tollgate Rd→Delano (Right); F05; alt GPS
CAS04476-612	SJ_700+	-116.83476442	33.675115290	Y	2	74E→Fairview Ave (Right)→Bautista Rd→Hixon Trail; F05
CAS04476-625	SJ_700+	-116.79008943	33.748403844		4	4wd required; did not recon F05
CAS04476-635	SJ_700+	-116.78058655	33.803294547		4	243 and is by the Dark Canyon campground; did not locate/no recon; S06
CAS04476-688	SJ_700+	-116.70499781	33.751898674		2	243→South Circle Dr→Tahquitz Drive (left)→South Circle Drive; F05
CAS04476-690	SJ_700+	-116.75849262	33.760512058		5	
CAS04476-699	SJ_700+	-116.67988812	33.678650099		2	74E→Apple Canyon Rd (left)→Campsite #93; F05
CAS04476-714	SJ_700+	-116.79160675	33.740471595		6	Inaccessable (slope and brush); F05
CAS04476-726	SJ_700+	-116.74499913	33.764293240		6	No water F05
CAS04476-729	SJ_700+	-116.75272268	33.773846076		5	
CAS04476-734	SJ_700+	-116.77532629	33.778135881		4	243→Pine Cove Rd→San Jacinto Ridge Rd; F05; .19 mile hike; F05
CAS04476-750	SJ_700+	-116.79509006	33.617747401		4	74E→Fairview Ave (Right)→Bautista Rd→Dirt trail; F05

Appendix C: CRAM Office Assessment

Office preparation of CRAM site visits.

Prior to each wetland site visit, initial office work acquired site imagery used to plan navigation and logistics for the site visit, and to assemble information about the management of the site and its possible stressors.

C1. Navigation to CRAM site

The best, although not always available, way to navigate to the individual assessment area (AA) or CRAM site is to find someone familiar with the area. Combining a series of Google Earth aerial photographs with published roadmaps is the (second) most convenient manner to locate and navigate to the CRAM site.

After locating the latitude and longitude (Lat/Lon) coordinates of each site in Google Earth, we selected and printed a "Freeway view" (*Figure C1* for site 71), a "Street view" (*Figure C2* for site 71), and a "Close Up view" (*Figure C3* for site 71) of the CRAM site. The "Freeway view" included enough road information to get the investigators from their point of origin, or last site, to the general CRAM site area. The "Street view" showed enough information to get the investigators from the Freeway or main highway to a safe and practical parking space near the CRAM site, and the "Close up view" included details showing parking place and enough specific information for walking to the CRAM site. The specific information included man-made landmarks such as particular road shapes, railroad tracks, buildings, tanks, dams, bridges, or natural objects, such as rock formations, large trees, or the river bed itself. The ruler in Google Earth was used for assessing the terrain and hiking distance from the parked car to the CRAM site.

Comparing the aerials with published roadmaps (*Figure C4* for site 71) confirmed landmarks on the aerial images used, such as cross streets, trails, or other landmarks, and thus verified the fit of the navigation information against the system of the California freeways and local roads. There were sites when there was no real need for a "Freeway view", because the investigator was already familiar with the area because another site was in close proximity. For some CRAM sites using multiple "Street views" or "Close up views" proved useful.

C2. Initial Office Assessment of Condition Metrics and Stressors

Preliminary scores were developed for select metrics, based on existing documentation (aerial photographs, reports, and communication with site management staff), before conducting actual fieldwork. As stated in CRAM manual v.4.2, this preliminary scoring is not completely necessary, however, and any preliminary scores determined were verified at the site. The aerial photographs were collected from GoogleEarth.com. For aerial photos the minimum pixel resolution is 3m x 3m. This provided enough resolution to perform an initial assessment of the metrics in Table C1 (see *Figure C3* for Santa Ana/San Jacinto study's site 71). Existing Digital Orthogonal Quarterly Quadrangles (DOQQs) dating from 1998 to 2004 with a pixel resolution of 3m, and georectified natural color imagery dated 2005 with a pixel resolution of 1m are available for the entire state. CRAM software is designed to work with any geo-rectified imagery. It can be loaded into the image directory and then used with a tablet computer or laptop in the field to map CRAM sites and conduct the assessment using CRAM.

Table C1: CRAM metrics for which preliminary scores can be developed prior to the site visit.

Background Information to Assemble Prior to the Site Visit			
□ 1m -3m pixel resolution digital geo-rectified site imagery □ Site-specific and neighboring reports on hydrology, ecology, chemistry, etc. □ Access permission if needed □ Preliminary map of the Assessment Area □ Maps to the site, access points, and other logistical information			
Metrics/Submetrics Suitable for Preliminary Scoring Prior to Site Visit			
Attributes		**Metrics/Submetrics**	**Suitable?**
Buffer and Landscape Context		Landscape Connectivity	Yes
		Percent of AA with Buffer	Yes
		Average Buffer Width	Yes
		Buffer Condition	No
Hydrology		Water Source	Yes
		Hydroperiod or Channel Stability	No
		Hydrologic Connectivity	Yes
Structure	Physical	Structural Patch Richness	No
		Topographic Complexity	No
	Biotic	Organic Matter Accumulation	No
		Number of Plant Layers Present	No
		Percent of Layers Dominated by Non-native Species	No
		Number of Co-dominant Species	No
		Percent of Co-dominants that are Non-native	No
		Interspersion and Zonation	No
		Vertical Biotic Structure	No

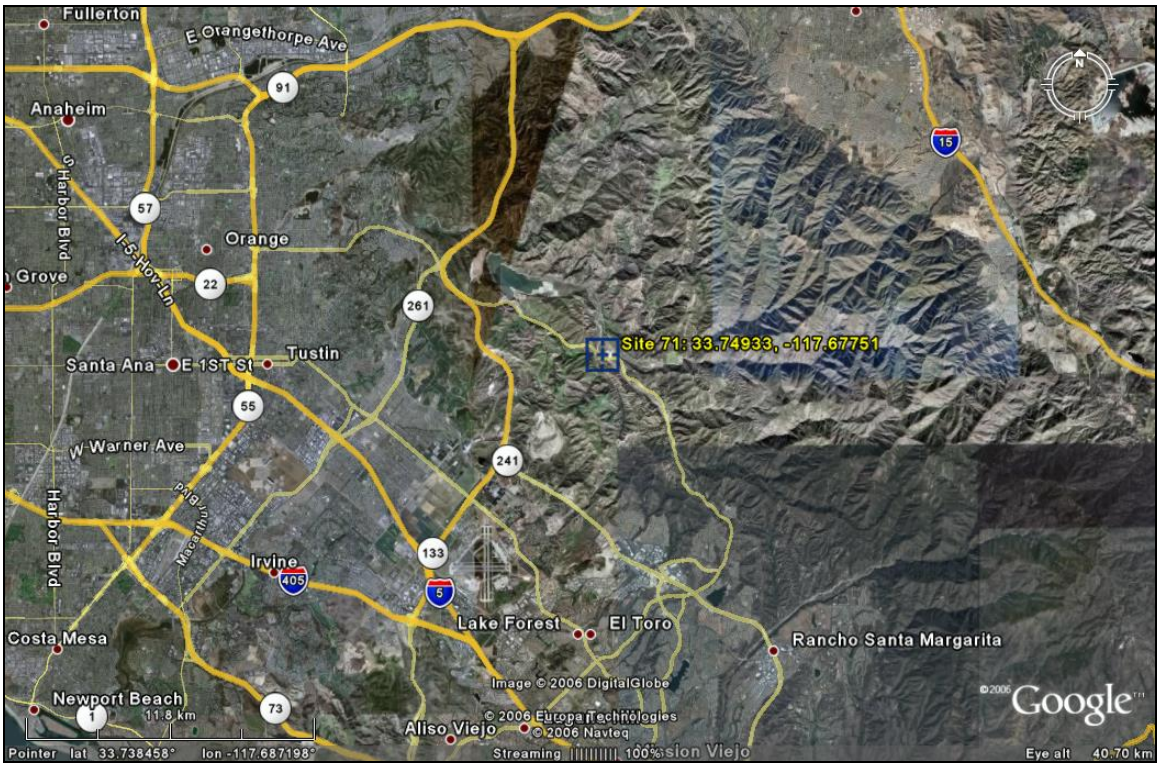


Figure C1: Site 71, freeway view

Figure C2: Site 71, street view

Figure C3: Site 71, close-up view, with ruler and assessment area.

Figure C4: Site 71, street view in map format (Thomas Bros (1999))

Appendix D: CRAM Field Data Entry Sheet

The following data entry sheet was adapted for this project from The CRAM Manual version 4.2.0. (Collins et al., 2006)

Assessment Form: Riverine - Unconfined

Basic Information

Site Name				
Site No.	**Date (m/d/y)**			
Investigators				
County	**Assessment Area Size (ha)**			
GPS Coordinates of center of AA (as NAD 83 lat./lon.)	Please see GPS entry space below…			
□ **Restoration** □ **Mitigation** □ **Impacted** □ **Other**				

Note: Shaded fields will be populated when data are uploaded via CRAM-IT software.

Did the river/stream have flowing water at the time of the assessment?

□ yes □ no

What is the apparent hydrologic flow regime[1] of the reach you are assessing?
The hydrologic flow regime of a stream describes the frequency with which the channel conducts water. *Perennial* streams conduct water all year long, whereas *ephemeral* streams conduct water only during and immediately following precipitation events. *Intermittent* streams are dry for part of the year, but conduct water for periods longer than ephemeral streams, as a function of watershed size and water source.

□ **perennial** □ **ephemeral** □ **intermittent**

Goal GPS coordinates	***Actual GPS coordinates***
Lat:	***Lat:***
Lon:	***Lon:***
Elev:	***Elev:***

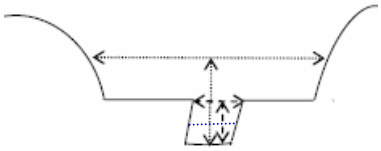
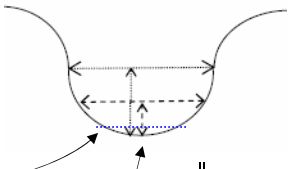
Sketch of assessment area (mark GPS site with an X)

Metric Information

<table>
<tr><td colspan="3">WETLAND CLASS: Riverine – Unconfined</td></tr>
<tr><td colspan="3">BUFFER and LANDSCAPE CONTEXT</td></tr>
<tr><td rowspan="3">1a.
Landscape Connectivity</td><td>3</td><td>There is at least 500 m of riparian area extending upstream and downstream of the AA on both sides of the AA that is not interrupted by any non-buffer land covers at least 10 m wide (see Table 4.3).</td></tr>
<tr><td>2</td><td>There is at least 500 m of riparian area extending upstream and downstream of the AA on one side of the AA that is not interrupted by any non-buffer land covers at least 10 m wide (see Table 4.3).</td></tr>
<tr><td>1</td><td>There is less that 500 m of riparian area extending upstream and downstream of the AA on both sides of the AA that is not interrupted by any non-buffer land covers at least 10 m wide (see Table 4.3).</td></tr>
<tr><td rowspan="4">1b.
Percent of AA with Buffer</td><td>4</td><td>Buffer is > 75 - 100% of AA perimeter.</td></tr>
<tr><td>3</td><td>Buffer is > 50 – 74% of AA perimeter.</td></tr>
<tr><td>2</td><td>Buffer is 25 – 49% of AA perimeter.</td></tr>
<tr><td>1</td><td>Buffer is < 25% of AA perimeter.</td></tr>
<tr><td colspan="3">Calculating average buffer width
Estimate average buffer width of AA in each of its quadrants and average for scoring.
<table>
<tr><th>Buffer Quadrant</th><th>Buffer Width in Meters</th></tr>
<tr><td>Quadrant 1</td><td>A.</td></tr>
<tr><td>Quadrant 2</td><td>B.</td></tr>
<tr><td>Quadrant 3</td><td>C.</td></tr>
<tr><td>Quadrant 4</td><td>D.</td></tr>
<tr><td>Average buffer width</td><td>E.</td></tr>
</table></td></tr>
<tr><td rowspan="4">1c.
Average Buffer Width</td><td>4</td><td>Average buffer width of AA is ≥ 200 m.</td></tr>
<tr><td>3</td><td>Average buffer width of AA is 100 – 199 m.</td></tr>
<tr><td>2</td><td>Average buffer width of AA is 50 – 99 m.</td></tr>
<tr><td>1</td><td>Average buffer width of AA is 0 - 49 m.</td></tr>
<tr><td rowspan="4">1d.
Buffer Condition</td><td>4</td><td>Buffer for AA is characterized by abundant native vegetation and little to no cover of non-native plants, with intact soils, and little or no trash or refuse.</td></tr>
<tr><td>3</td><td>Buffer for AA is characterized by moderate cover of native vegetation, moderate cover of non-native plants, intact or moderately disrupted soils, moderate or lesser amounts of trash or refuse, and minor intensity of human visitation or recreation.</td></tr>
<tr><td>2</td><td>Buffer for AA is characterized by a prevalence of non-native plants, and either moderate or extensive soil disruption, moderate or greater amounts of trash or refuse, and moderate intensity of human visitation or recreation.</td></tr>
<tr><td>1</td><td>Buffer for AA is characterized by barren ground and highly compacted or otherwise disrupted soils, with moderate or greater amounts of trash or refuse, and moderate or greater intensity of human visitation or recreation; OR there is no buffer present.</td></tr>
</table>

WETLAND CLASS: Riverine – Unconfined (cont'd)		
HYDROLOGY		
2a. Water Source	**4**	Dry-season freshwater source for AA is precipitation, groundwater, and/or natural runoff, or an adjacent freshwater body, or system naturally lacks water in the dry season. There is no indication of direct artificial water sources. Land use in the local drainage area of the AA is primarily open space or low density, passive uses. No large point sources discharge into or adjacent to the AA.
	3	Dry-season freshwater source is mostly natural, but AA directly receives occasional or small amounts of inflow from anthropogenic sources. Indications of anthropogenic input include developed land or irrigated agricultural land (< 20%) in the immediate drainage area of the AA, or the presence of small stormdrains or other local discharges emptying into the AA, or the presence of scattered homes along the wetland that probably have septic systems. No large point sources discharge into or adjacent to the AA.
	2	Dry-season freshwater source is primarily urban runoff, direct irrigation, pumped water, artificially impounded water, or other artificial hydrology. Indications of substantial artificial hydrology include > 20% developed or irrigated agricultural land adjacent to the AA, and the presence of major point sources that discharge into or adjacent to the AA. **OR** Dry season freshwater flow exists but has been substantially diminished by known diversions of water or other withdrawals directly from the AA, its encompassing wetland, or from areas adjacent to the AA or its wetland.
	1	Natural, dry-season or end-of-wet-season sources of freshwater have been eliminated based on the following indicators: observable diversion of all dry-season flow, etc., and predominance of xeric vegetation (see Table 4.7b).
2b Hydroperiod or Channel Stability	**4**	Most of the channel through the AA is characterized by equilibrium conditions, with little evidence of aggradation or degradation (based on the field indicators listed in Table 4.8).
	3	Most of the channel through the AA is characterized by some aggradation or degradation, none of which is severe, and the channel seems to be approaching an equilibrium form (based on the field indicators listed in Table 4.8).
	2	There is evidence of severe aggradation or degradation of most of the channel through the AA (based on the field indicators listed in Table 4.8), or the channel is artificially hardened through less than half of the AA.
	1	The channel is concrete or is otherwise artificially hardened through most of the AA.

Calculating entrenchment ratio

Step 1: Estimate bankfull width. 	This is a critical step requiring experience. If the stream is entrenched, the depth of bankfull flow is identified as a scour line, narrow bench, or the top of active point bars well below the top of apparent channel banks. If the stream is not entrenched, bankfull stage can correspond to the elevation of a broader floodplain with indicative riparian vegetation. Once the bankfull contour is identified, estimate the bankfull channel width.	
Step 2: Estimate bankfull depth.	Once the bankfull contour is identified, estimate its maximum depth to the channel bottom.	
Step 3: Estimate flood prone depth.	Double the estimate of maximum bankfull depth from Step 2, and note the location of the new depth on the channel bank.	
Step 4: Estimate flood prone width.	Estimate the width of the channel at the flood prone depth.	
Step 5: Calculate entrenchment ratio.	Divide the flood prone width (result of Step 4) by the maximum bankfull width (result of Step 1)	
	Result	

WETLAND CLASS: Riverine – Unconfined (cont'd)

2c. Hydrologic Connectivity	**3**	Entrenchment ratio is > 7.5.
	2	Entrenchment ratio is 3 – 7.4.
	1	Entrenchment ratio is < 2.9.

PHYSICAL STRUCTURE

3a. Structural Patch Richness	**4**	>12 of the possible patch types are evident in the AA.
	3	9 – 10 of the possible patch types are evident in the AA.
	2	6 – 8 of the possible patch types are evident in the AA.
	1	≤5 of the possible patch types are evident in the AA.

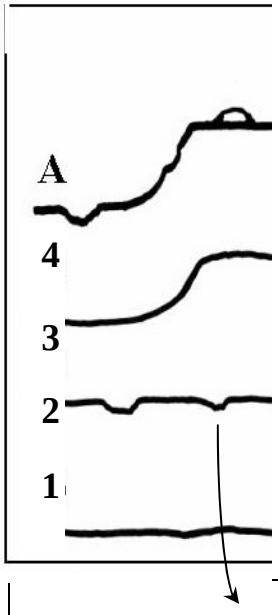
See next page

3a. continued

Structural Patch Richness

Circle each type of patch that is observed in the AA and enter the total number of observed patches in table below.

STRUCTURAL PATCH TYPE (check for presence)	Riverine (Unconfined)
Minimum Patch Size	3m²
Secondary channels on floodplains or along shorelines	**1**
Swales on floodplain or along shoreline	**1**
Pannes or pools on floodplain	**1**
Islands (exposed at high-water stage)	**1**
Pools in channels	**1**
Riffles or rapids	**1**
Point bars and in-channel bars	**1**
Debris jams	**1**
Abundant wrackline in channel or on floodplain	**1**
Hummocks and/or sediment mounds	**1**
Bank slumps or undercut banks in channels or along shoreline	**1**
Variegated foreshore overall (instead of broadly arcuate or essentially straight)	**1**
Standing snags	**1**
Macroalgae	**1**
Concentric or parallel high water marks	**1**
Cobble and/or Boulders	**1**
Total Possible	**16**
No. Observed Patch Types	



3b. Topographic Complexity

4	AA as viewed along cross-sections has a variety of slopes, or elevations, that are characterized by different moisture gradients. Each sub-slope contains physical patch types or features that contribute to irregularity in height, edges, or surface of the AA and to complex topography overall.
3	AA has a variety of slopes, or elevations, that are characterized by different moisture gradients; however, each sub-slope lacks many physical patch types, such that the slopes or elevation zones tend to be regular and uniform.
2	AA has a single, uniform slope or elevation. However that slope, or elevation, has a variety of physical patch types.
1	AA has a single, uniform slope, or elevation, with few physical patch types.

BIOTIC STRUCTURE		
4a. Organic Matter Accumulation	**4**	The AA is characterized by an abundance of fine organic matter in topographic lows, along high-water shorelines, and across vegetated plains. There is a range of kinds of organic matter representing all the visible stages of processing, from whole plant parts to fine detritus.
	3	The AA is characterized by a moderate amount of fine organic matter in a patchy distribution. There is some matter of various sizes, but new materials seem much more prevalent than old materials. Litter layers, duff layers, and leaf piles in pools or topographic lows are thin.
	2	The AA is characterized by occasional small amounts of coarse organic debris, such as leaf litter or thatch, with only traces of fine debris, and with little evidence of organic matter recruitment.
	1	The AA contains essentially no significant amounts of coarse plant debris, and only scant amounts of fine debris.

Plant Community Composition - Plant layers and their dominance by non-native species for all Non-saline Estuarine, Riverine, Slope, Lacustrine, and Depressional Wetlands

Non-saline Estuarine, Riverine, Depressional, Slope, and Lacustrine	**Plant Layer**				
	Aquatic/Semi-aquatic		**Terrestrial/Riparian**		
	Submergent	**Emergent (all)**	**Short (< 1 m)**	**Medium (1-3 m)**	**Tall (> 3 m)**
Mark if layer present (≥ 5% of suitable habitat area)					
Mark if dominated by non-native species (≥ 50% of the layer is represented by non-natives)					
Total number of layers present					
Percent of layers dominated by non-native species					

4B. NUMBER OF PLANT LAYERS PRESENT	**4**	4 – 5 layers are present.
	3	3 layers are present.
	2	2 layers are present.
	1	0 – 1 layer is present.
4C. PERCENT OF LAYERS DOMINATED BY NON-NATIVE SPECIES	**4**	0 – 24%
	3	25 – 49%
	2	50 – 74%
	1	75 – 100%

Plant Community Composition - Co-dominant species richness for all wetlands.

Dominant species represent ≥ 10% *relative* cover–Mark all non-natives based on Appendix 3

Submergent Aquatic/Semi-aquatic		Tall Terrestrial/Riparian
Emergent Aquatic/Semi-aquatic		**Medium Terrestrial/Riparian**
Short Terrestrial/Riparian		
Total number of co-dominant species for all layers combined		
Percent of co-dominant species that are non-nativ		

4D. ***NUMBER OF CO-DOMINANT SPECIES***	**4**	≥ 12 co-dominant species
	3	7 – 11 co-dominant species
	2	4 – 6 co-dominant species
	1	0 – 3 co-dominant species
4e. Percent of Co-dominant Species that are Non-native	**4**	0 – 39%
	3	40 – 69%
	2	70 – 89%
	1	90 – 100%
4f. Interspersion and Zonation	**4**	Wetland has a high degree of plan-view interspersion.
	3	Wetland has a moderate degree of plan-view interspersion.
	2	Wetland has a low degree of plan-view interspersion.
	1	Wetland has essentially no plan-view interspersion.
4g. Vertical Biotic Structure	**4**	More than 50 % of vegetated area of the AA supports <u>abundant</u> overlap of height classes (see Figure 4.6).
	3	More than 50 % of area supports at least <u>moderate</u> overlap of height classes.
	2	25 – 50 % of the vegetated AA supports at least <u>moderate</u> overlap of plant layers, **or** three plant layers are well represented in the AA but there is little to no overlap.
	1	Less than 25% of vegetated AA supports <u>moderate</u> overlap of height classes, **or** two layers are well represented with little overlap, **or** AA is sparsely vegetated overall.

CRAM Scoring Sheet

		Office Score	Field Score	Comments
Buffer and Landscape Context				
1a.	Landscape Connectivity			
1b.	Percent of AA with Buffer			
1c.	Average Buffer Width			
1d.	Buffer Condition			
Hydrology				
2a.	Water Source			
2b.	Hydroperiod or Channel Stability			
2c.	Hydrologic Connectivity			
Physical Structure				
3a.	Structural Patch Richness			
3b.	Topographic Complexity			
Biotic Structure				
4a.	Organic Matter Accumulation			
4b.	Number of Plant Layers Present			
4c.	Percent of Layers Dominated by Non-native Species			
4d.	Number Co-dominant Species			
4e.	Percent Co-dominant Species that are Non-native			
4f.	Interspersion and Zonation			
4g.	Vertical Biotic Structure			
Photograph notes:				

HYDROLOGY	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Point Source (PS) Discharges (POTW, other non-stormwater discharge)		
Non-point Source (Non-PS) Discharges (urban runoff, farm drainage)		
Flow diversions or unnatural inflows		
Dams (reservoirs, detention basins, recharge basins)		
Flow obstructions (culverts, paved stream crossings)		
Weir/drop structure, tide gates		
Dredged inlet/channel		
Engineered channel (riprap, armored channel bank, bed)		
Dike/levees		
Groundwater extraction		
Ditches (borrow, agricultural drainage, mosquito control, etc.)		
Actively managed hydrology		
Comments		

PHYSICAL STRUCTURE	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Filling or dumping of sediment or soils **(N/A for restoration areas)**		
Grading/ compaction **(N/A for restoration areas)**		
Plowing/Discing **(N/A for restoration areas)**		
Resource extraction (sediment, gravel, oil and/or gas)		
Vegetation management		
Excessive sediment or organic debris from watershed		
Excessive runoff from watershed		
Nutrient impaired (PS or Non-PS pollution)		
Heavy metal impaired (PS or Non-PS pollution)		
Pesticides or trace organics impaired (PS or Non-PS pollution)		
Bacteria and pathogens impaired (PS or Non-PS pollution)		
Trash or refuse		
Comments		

Stressor Checklist Worksheets (cont'd)

BIOTIC STRUCTURE	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Mowing, grazing, excessive herbivory (within AA)		
Excessive human visitation		
Predation and habitat destruction by non-native vertebrates (e.g., *Virginia opossum* and domestic predators, such as feral pets)		
Tree cutting/sapling removal		
Removal of woody debris		
Treatment of non-native and nuisance plant species		
Pesticide application or vector control		
Evidence of fire		
Evidence of flood		
Biological resource extraction or stocking (fisheries, aquaculture)		
Excessive organic debris in matrix (for vernal pools)		
Lack of vegetation management to conserve natural resources		
Lack of appropriate treatment of invasive plant species adjacent to AA or buffer		
Comments		

ADJACENT LAND USE	**Present and likely to have negative effect on AA**	**Significant negative effect on AA**
Urban residential		
Industrial/commercial		
Military training/Air traffic		
Dryland farming		
Intensive row-crop agriculture		
Orchards/nurseries		
Commercial feedlots		
Dairies		
Ranching (enclosed livestock grazing or horse paddock or feedlot)		
Transportation corridor		
Rangeland (livestock rangeland also managed for native vegetation)		
Sports fields and urban parklands (golf courses, soccer fields, etc.)		
Passive recreation (bird-watching, hiking, etc.)		
Active recreation (off-road vehicles, mountain biking, hunting, fishing)		
Physical resource extraction (rock, sediment, oil/gas)		
Biological resource extraction (aquaculture, commercial fisheries)		
Comments		

Table 4.19 from CRAM Version 4.2: Ratings for Plant Community Composition Metrics

Rating	Number of Plant Layers Present	Percent of Layers Dominated by Non-native Species	Number Co-dominant Species	Percent of Co-dominant Species that are Non-native
***Unconfined* Riverine Wetlands**				
4	4 – 5	0 – 24%	≥ 12	0 – 39%
3	3	25 – 49%	7 – 11	40 – 69%
2	2	50 – 74%	4 – 6	70 – 89%
1	0 – 1	75 – 100%	0 – 3	90 – 100%

Patch Type Definitions

Secondary channels on floodplains or along shorelines

Channels represent the physical confine of riverine or estuarine flow. A channel consists of a bed and its opposing banks, plus its functional floodplain. Wetlands can have a primary channel that conveys most flow, and secondary channels that convey flood flows. Short tributary channels that originate in the wetland and that only convey flow between the wetland and the primary channel are also regarded as secondary channels. Secondary channels may be located in the main channel basin or on the floodplain and may be dry or wetted at the time of assessment.

Swales on floodplain or along shoreline

Swales are broad, elongated, sometimes-vegetated, tributaries that convey seasonal runoff and lack a well defined bed and bank, obvious deeps and shallows, or other characteristics of channels. Swales can act as zones of infiltration, as well as groundwater discharge.

Pannes or pools on floodplain

A panne is a broad, shallow depression composed of very fine sediments, and surrounded by a vegetated wetland plain. Pannes fill with water at least seasonally, and differ from vernal pools by lacking an abundance of emergent vegetation of any kind.

Islands (exposed at high-water stage)

An island is an area of land above the usual high water level and, at least at times, surrounded by water in a river, lake, lagoon, or estuary. Islands differ from hummocks and other mounds by being large enough to support multiple trees or large shrubs.

Pools in channels

Pools are areas along tidal and fluvial channels that fill with water at least seasonally, and that tend to retain water when the rest of the channel or plain is drained. Pools in channels are generally too deep to support emergent vegetation.

Riffles or rapids

Riffles and rapids are standing waves caused by channel bed forms such as plunge pools, or submerged bed materials such as gravel, cobbles, boulders, etc. Riffles and rapids add oxygen to the water, and provide habitat for many fish and invertebrates.

Point bars and in-channel bars

Bars are sedimentary features within intertidal and fluvial channels. They are patches of transient bedload sediment that form along the inside of meander bends or in the middle of straight channel reaches. They sometimes support vegetation. They are convex in profile and their surface material varies in size from small on top to larger along the lower margins. They can consist of any mixture of silt, sand, gravel, cobble, and boulders.

Debris jams

A debris jam is an accumulation of drift wood and other flotage across a channel that partially obstructs water flow.

Wrackline in channel or on floodplain

Wrack is an accumulation of natural or unnatural floating debris along the high water line of a wetland.

Hummocks or sediment mounds

Hummocks are mounds created by plants in slope wetlands, depressions, and along the banks and floodplains of fluvial and tidal systems. Hummocks are typically less than 1m high. Sediment mounds are similar to hummocks without the vegetated cover.

Bank slumps or undercut banks in channels or along shoreline

Bank slumps form when a chunk of bank material breaks off and slides into the channel in a fluvial or tidal system, where it becomes cemented in place. Both bank slumps and boulders are durable objects that are intransient except under extremely high-powered flow events. Boulders (rocks with a diameter of more than 10" (256mm)) and hardened bank slumps within the channel or along the shoreline can influence channel formation and create microhabitats. Undercut banks are concave features created when strong currents scour earthen banks. Bank erosion below the water line creates "shelves" that provide habitat for fish and other aquatic organisms.

Variegated foreshore overall

For lacustrine, riverine, lagoon, and playa wetlands, the shoreline is the boundary between the wetland and the aquatic system or open water environment, including the banks of tidal creeks. For all other wetlands, the shoreline is the boundary between the wetland and the upland. As viewed from above, the shoreline can be straight, curved, or variegated. A variegated shoreline can be sketched as a sequence of s-shaped curves of varying amplitude and asymmetry, such that the line seems to meander or wander.

Standing snags

Tall, woody vegetation, such as trees and tall shrubs, can take many years to fall to the ground after dying. As these standing "snags" decompose, they provide habitat for birds and many other
organisms. Any standing, dead woody vegetation that is at least 12 feet tall is considered a snag.

Macroalgae

Benthic macroalgae attach to the bottom sediments or other substrates in fresh, brackish, and saline water bodies. Macroalgae also occur in surface layers of soils and porous rocks, on the bark and leaves of trees, and in symbiotic association with fungi to form lichens. These organisms are important primary producers, representing the base of the food chain in some wetlands. They also contribute to the fertility of the soil in providing habitat for benthic and soil organisms.

Concentric or parallel high water marks

Repeated, seasonal and interannual variation in water level in a wetland can cause concentric zones in soil moisture, topographic slope, and chemistry that translate into visible zones of different vegetation types and soils, greatly increasing overall ecological diversity.

Cobble and boulders

Cobble and boulders are rocks of different size categories. The long axis of cobble ranges from about 2.5" to 10.0". A boulder is any rock having a long axis greater than 10". Submerged cobbles and boulders provide abundant habitat for aquatic macroinvertebrates and small fish. Emergent or exposed cobbles and boulders provide roosting habitat for birds, shelter for amphibians, and they contribute to patterns of shade and light and air movement near the ground surface that affect soil moisture gradients, aeolian deposition of seeds and organic debris, and overall substrate complexity.

Appendix E: Compiled CRAM data in a user friendly format

The following information has been provided to Region 8 in Excel spreadsheet format. This data

Table E1: Strata, Sites and CRAM scores

Stratum	Site	Lat	Lon	Elevation	CRAM score
SA_0-350	11	33.850751000	-117.78352517	120	67.31%
SA_0-350	12	33.919145069	-117.81995033	229	65.65%
SA_0-350	15	33.892216066	-117.68321695	166	64.79%
SA_0-350	19	33.911511385	-117.61286303	166	59.82%
SA_0-350	42	33.945867213	-117.61435352	166	67.00%
SA_0-350	46	33.792624077	-117.71671396	256	70.80%
SA_0-350	71	33.749330000	-117.67751000	274	66.40%
				mean =	**65.97%**
				S.E. =	**1.25%**
SA_350-700	17	34.161176723	-117.36382035	438	50.70%
SA_350-700	28	34.203004484	-117.44504460	681	57.53%
SA_350-700	32	34.077298499	-117.08738209	664	54.50%
SA_350-700	51	33.995912140	-117.15384395	494	69.07%
SA_350-700	55	34.039260000	-117.21973000	378	55.77%
SA_350-700	79	34.219556993	-117.40595247	627	70.74%
SA_350-700	85	34.049964960	-117.23309791	357	49.04%
				mean =	**58.19%**
				S.E. =	**3.22%**
SA_700+	2	34.144227205	-117.06210253	857	69.84%
SA_700+	7	34.094982144	-116.96380672	1330	58.30%
SA_700+	14	34.183644702	-117.62619063	905	62.77%
SA_700+	22	34.158427000	-116.88753000	2181	71.95%
SA_700+	27	34.306522607	-117.47032066	920	70.19%
SA_700+	34	34.089394000	-116.93008031	1555	51.62%
SA_700+	35	34.077479169	-116.87489914	2000	65.22%
				mean =	**64.27%**
				S.E. =	**2.78%**
SJ_350-700	95	33.831200000	-117.09486000	447	46.15%
SJ_350-700	116	33.664073369	-117.27871316	394	76.79%
SJ_350-700	130	33.728154000	-117.02213000	460	53.85%
SJ_350-700	160	33.731412000	-116.81070000	639	68.88%
SJ_350-700	243	33.827800000	-117.20900000	438	50.18%
SJ_350-700	331	33.745380000	-117.23571000	428	66.35%
SJ_350-700	347	33.845882299	-116.99166922	537	0.00%
				mean =	**51.74%**
				S.E. =	**9.57%**
SJ_700+	20	33.767000000	-116.69020000	1931	59.45%
SJ_700+	70	33.771300000	-116.76800000	1368	82.69%
SJ_700+	172	33.784315302	-116.83797267	795	65.22%
SJ_700+	206	33.731904000	-116.74231300	1549	71.76%
SJ_700+	266	33.653887189	-116.81659916	818	74.47%
SJ_700+	484	33.659625124	-116.82052651	782	70.62%
SJ_700+	612	33.675115290	-116.83476442	746	70.62%
				mean =	**70.69%**
				S.E. =	**2.74%**

Table E2: CRAM Attributes for determining CRAM scores

Stratum	Sites	Buffer + Landscape	Hydrology	Physical structure	Biological structure
SA_0-350	11	2.000	6	5	22
SA_0-350	12	2.140	7	4	21
SA_0-350	15	2.689	9	3	19
SA_0-350	19	2.107	9	3	19
SA_0-350	42	1.841	9	5	19
SA_0-350	46	2.816	9	6	19
SA_0-350	71	2.530	10	**6**	**16**
Mean =		**2.303**	**8.4**	**4.6**	**19.3**
S.E. =		**0.141**	**0.5**	**0.5**	**0.7**
SA_350-700	17	2.366	9	**2**	**13**
SA_350-700	28	2.914	9	4	14
SA_350-700	32	2.341	9	3	15
SA_350-700	51	2.914	7	4	22
SA_350-700	55	1.000	8	**4**	**16**
SA_350-700	79	1.783	10	4	21
SA_350-700	85	1.500	9	2	13
Mean =		**2.117**	**8.7**	**3.3**	**16.3**
S.E. =		**0.273**	**0.4**	**0.4**	**1.4**
SA_700+	2	2.316	10	4	20
SA_700+	7	2.316	9	4	15
SA_700+	14	2.640	11	3	16
SA_700+	22	2.414	9	**5**	**21**
SA_700+	27	1.500	11	3	21
SA_700+	34	1.841	9	3	13
SA_700+	35	2.914	10	6	15
Mean =		**2.277**	**9.9**	**4.0**	**17.3**
S.E. =		**0.180**	**0.3**	**0.4**	**1.2**
SJ_350-700	95	1.000	8	**2**	**13**
SJ_350-700	116	1.931	8	4	26
SJ_350-700	130	2.000	9	**4**	**13**
SJ_350-700	160	2.816	9	**5**	**19**
SJ_350-700	243	1.095	7	**2**	**16**
SJ_350-700	331	2.500	10	**4**	**18**
SJ_350-700	347	1.000	4	2	15
Mean =		**1.763**	**7.9**	**3.3**	**17.1**
S.E. =		**0.282**	**0.7**	**0.5**	**1.7**
SJ_700+	20	2.914	9	**5**	**14**
SJ_700+	70	2.000	8	**8**	**25**
SJ_700+	172	2.914	9	5	17
SJ_700+	206	2.316	10	**4**	**21**
SJ_700+	286	2.725	10	6	20
SJ_700+	484	2.725	11	4	19
SJ_700+	612	2.816	10	3	18
Mean =		**2.630**	**9.6**	**5.0**	**19.1**
S.E. =		**0.130**	**0.4**	**0.6**	**1.3**

Table E3: CRAM Attributes: buffer & hydrology metrics

		Buffer metrics				Hydrology metrics		
Stratum	**Sites**	*1a. Landscape Connectivity*	*1b. Percent of AA with Buffer*	*1c. Average Buffer Width*	*1d. Buffer Condition*	*2a. Water Source*	*2b. Hydroperiod or Channel Stability*	*2c. Hydrologic Connectivity*
SA 0-350	11	3	1	1	1	2	1	3
SA 0-350	12	2	3	3	3	2	4	1
SA 0-350	15	3	4	4	2	4	4	1
SA 0-350	19	2	4	3	2	3	2	3
SA 0-350	42	2	4	2	1	3	3	3
SA 0-350	46	3	4	4	3	4	4	1
SA 0-350	71	3	3	2	3	3	4	3
Mean =		**2.6**	**3.3**	**2.7**	**2.1**	**3.0**	**3.1**	**2.1**
S.E. =		**0.2**	**0.4**	**0.4**	**0.3**	**0.3**	**0.5**	**0.4**
SA 350-700	17	3	3	1	3	4	2	1
SA 350-700	28	3	4	4	4	3	3	3
SA 350-700	32	3	2	2	2	4	4	1
SA 350-700	51	3	4	4	4	3	3	1
SA 350-700	55	1	1	1	1	2	3	3
SA 350-700	79	2	3	1	2	3	4	3
SA 350-700	85	2	1	1	1	2	4	3
Mean =		**2.4**	**2.6**	**2.0**	**2.4**	**3.0**	**3.3**	**2.1**
S.E. =		**0.3**	**0.5**	**0.5**	**0.5**	**0.3**	**0.3**	**0.4**
SA 700+	2	2	4	4	3	4	4	2
SA 700+	7	2	3	4	4	4	2	3
SA 700+	14	3	3	3	3	4	4	3
SA 700+	22	2	4	4	4	4	4	1
SA 700+	27	2	1	1	1	4	4	3
SA 700+	34	2	4	2	1	4	2	3
SA 700+	35	3	4	4	4	4	4	2
Mean =		**2.3**	**3.3**	**3.1**	**2.9**	**4.0**	**3.4**	**2.4**
S.E. =		**0.2**	**0.4**	**0.5**	**0.5**	**0.0**	**0.4**	**0.3**
SJ 350-700	95	1	1	1	1	2	3	3
SJ 350-700	116	2	4	1	3	4	3	1
SJ 350-700	130	3	1	1	1	4	3	2
SJ 350-700	160	3	4	3	4	4	4	1
SJ 350-700	243	1	1	2	1	2	2	3
SJ 350-700	331	3	4	1	4	3	4	3
SJ 350-700	347	1	1	1	1	2	1	1
Mean =		**2.0**	**2.3**	**1.4**	**2.1**	**3.0**	**2.9**	**2.0**
S.E. =		**0.4**	**0.6**	**0.3**	**0.6**	**0.4**	**0.4**	**0.4**
SJ 700+	20	3	4	4	4	4	4	1
SJ 700+	70	2	4	1	4	4	3	1
SJ 700+	172	3	4	4	4	4	4	1
SJ 700+	206	2	4	3	4	4	4	2
SJ 700+	286	3	4	3	3	4	4	2
SJ 700+	484	3	4	3	3	4	4	3
SJ 700+	612	3	4	3	4	4	4	2
Mean =		**2.7**	**4.0**	**3.0**	**3.7**	**4.0**	**3.9**	**1.7**
S.E. =		**0.2**	**0.0**	**0.4**	**0.2**	**0.0**	**0.1**	**0.3**

Table E4: CRAM Attributes: physical & biological structure metrics

		Phyical structure metrics		Biological structure metrics						
Stratum	**Sites**	*3a. Structural Patch Richness*	*3b. Topographic Complexity*	*4a. Organic Matter Accumulation*	*4b. # Plant Layers Present*	*4c. % Layers Dominated by Non-native Species*	*4d. Number of Co-dominant Species*	*4e. % Co-dominant Species that are Non-native*	*4f. Interspersion and Zonation*	*4g. Vertical Biotic Structure*
SA 0-350	11	3	2	3	3	4	3	4	3	2
SA 0-350	12	1	3	2	3	4	3	4	3	2
SA 0-350	15	1	2	4	2	4	2	4	2	1
SA 0-350	19	3	3	2	2	4	1	4	1	1
SA 0-350	42	2	3	4	2	4	2	4	2	1
SA 0-350	46	2	4	4	2	3	3	4	2	1
SA 0-350	71	2	4	3	2	4	1	4	1	1
	Mean =	**2.0**	**3.0**	**3.1**	**2.3**	**3.9**	**2.1**	**4.0**	**2.0**	**1.3**
	S.E. =	**0.3**	**0.3**	**0.3**	**0.2**	**0.1**	**0.3**	**0.0**	**0.3**	**0.2**
SA 350-700	17	1	1	1	1	4	1	4	1	1
SA 350-700	28	2	2	2	1	4	1	4	1	1
SA 350-700	32	1	2	2	2	4	1	4	1	1
SA 350-700	51	1	3	1	4	4	3	4	3	3
SA 350-700	55	1	3	1	3	4	2	4	1	1
SA 350-700	79	2	2	3	3	4	3	4	3	1
SA 350-700	85	1	1	1	1	4	1	4	1	1
	Mean =	**1.3**	**2.0**	**1.6**	**2.1**	**4.0**	**1.7**	**4.0**	**1.6**	**1.3**
	S.E. =	**0.2**	**0.3**	**0.3**	**0.5**	**0.0**	**0.4**	**0.0**	**0.4**	**0.3**
SA 700+	2	2	2	3	3	4	3	4	2	1
SA 700+	7	2	2	2	2	4	1	4	1	1
SA 700+	14	1	2	2	2	4	2	4	1	1
SA 700+	22	2	3	2	3	4	2	4	3	3
SA 700+	27	1	2	3	3	4	3	4	2	2
SA 700+	34	1	2	1	1	4	1	4	1	1
SA 700+	35	2	4	2	2	4	1	4	1	1

		Phyical structure metrics		Biological structure metrics						
Stratum	Sites	*3a. Structural Patch Richness*	*3b. Topographic Complexity*	*4a. Organic Matter Accumulation*	*4b. # Plant Layers Present*	*4c. % Layers Dominated by Non-native Species*	*4d. Number of Co-dominant Species*	*4e. % Co-dominant Species that are Non-native*	*4f. Interspersion and Zonation*	*4g. Vertical Biotic Structure*
	Mean =	**1.6**	**2.4**	**2.1**	**2.3**	**4.0**	**1.9**	**4.0**	**1.6**	**1.4**
	S.E. =	**0.2**	**0.3**	**0.3**	**0.3**	**0.0**	**0.3**	**0.0**	**0.3**	**0.3**
SJ 350-700	95	1	1	1	3	1	2	4	1	1
SJ 350-700	116	2	2	4	4	4	3	4	3	4
SJ 350-700	130	1	3	1	1	4	1	4	1	1
SJ 350-700	160	3	2	1	2	4	2	4	3	3
SJ 350-700	243	1	1	1	4	4	2	2	2	1
SJ 350-700	331	1	3	1	4	4	2	4	2	1
SJ 350-700	347	1	1	2	2	4	2	3	1	1
	Mean =	**1.4**	**1.9**	**1.6**	**2.9**	**3.6**	**2.0**	**3.6**	**1.9**	**1.7**
	S.E. =	**0.3**	**0.3**	**0.4**	**0.5**	**0.4**	**0.2**	**0.3**	**0.3**	**0.5**
SJ 700+	20	1	4	1	2	4	1	4	1	1
SJ 700+	70	4	4	4	3	4	2	4	4	4
SJ 700+	172	1	4	1	3	3	2	3	3	2
SJ 700+	206	1	3	2	3	4	2	4	3	3
SJ 700+	286	2	4	3	3	4	2	4	2	2
SJ 700+	484	2	2	2	3	4	3	4	2	1
SJ 700+	612	1	2	2	2	4	2	4	2	2
	Mean =	**1.7**	**3.3**	**2.1**	**2.7**	**3.9**	**2.0**	**3.9**	**2.4**	**2.1**
	S.E. =	**0.4**	**0.4**	**0.4**	**0.2**	**0.1**	**0.2**	**0.1**	**0.4**	**0.4**